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NATIONAL DAM INSPECTION PROGRAM. ILION RESERVOIR NUMBER 2 DAM (U)

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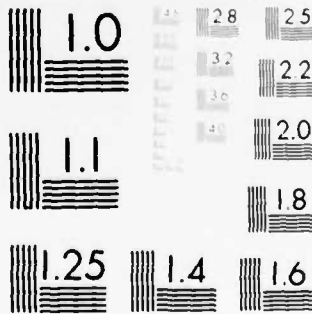
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MOHAWK RIVER BASIN
TOWN OF GERMAN FLATTS
HERKIMER COUNTY, NEW YORK

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**ILION RESERVOIR
NO. 2 DAM
NY 00185**

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
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18. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial work.		

The upstream slope of the dam is about 1.2H:1V and the downstream slope of the dam is about 1.5H:1V, both of which are considerably steeper than those of similar dams designed in accordance with modern standards of practice. Therefore, it is recommended that a stability investigation of the embankment, with particular attention to the steepness of the slopes, be started within 6 months after receipt of this report by the Owner. Any necessary remedial work should be completed within 18 months after receipt of this report by the Owner. The investigation and the design and construction observation of any remedial work should be done by a qualified, registered professional engineer.

Hydrologic and hydraulic analysis indicates that the dam would not be overtopped by the PMF. Therefore, in accordance with Corps of Engineers' screening criteria for review of spillway adequacy, spillway capacity is considered "adequate".

Because of other deficiencies, the following additional investigations should be started within 6 months after receipt of this report by the Owner. The investigations should be performed by a qualified, registered professional engineer.

- 1) Investigate the seepage and erosion on the bank of Ilion Gorge adjacent to the reservoir at locations of about 60 and 250 feet from the left abutment of the dam.
- 2) Investigate the cause of the soft, wet area next to the downstream toe in the deepest section of the valley.
- 3) Investigate the erosion and sloughing which has taken place on the east side of Ilion Gorge and the deterioration of the erosion protection there, caused by the discharge of water from the drainage ditch that is located along the south and west sides of the reservoir.
- 4) Investigate the spring house which is located 40 feet from the downstream toe of the dam to determine if there is any potential for the initiation of piping at the spring house.

Any remedial work deemed necessary as a result of these investigations should be completed within 18 months after receipt of this report by the Owner. A qualified, registered professional engineer should design and observe the construction of any necessary remedial work.

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

ILION RESERVOIR NO. 2 DAM, NY 00185

PHASE I INSPECTION REPORT

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NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No.: NY 00185
Name of Dam: Ilion Reservoir No. 2 Dam
State Located: New York
County: Herkimer
Municipality: Town of German Flatts
Watershed: Mohawk River Basin
Stream: Offstream of tributary of Steele Creek
Date of Inspection: June 4, 1981

ASSESSMENT

Examination of available documents and visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial work.

The upstream slope of the dam is about 1.2H:1V and the downstream slope of the dam is about 1.5H:1V, both of which are considerably steeper than those of similar dams designed in accordance with modern standards of practice. Therefore, it is recommended that a stability investigation of the embankment, with particular attention to the steepness of the slopes, be started within 6 months after receipt of this report by the Owner. Any necessary remedial work should be completed within 18 months after receipt of this report by the Owner. The investigation and the design and construction observation of any remedial work should be done by a qualified, registered professional engineer.

Hydrologic and hydraulic analysis indicates that the dam would not be overtopped by the PMF. Therefore, in accordance with Corps of Engineers' screening criteria for review of spillway adequacy, spillway capacity is considered "adequate".

Because of other deficiencies, the following additional investigations should be started within 6 months after receipt of this report by the Owner. The investigations should be performed by a qualified, registered professional engineer.

- 1) Investigate the seepage and erosion on the bank of Ilion Gorge adjacent to the reservoir at locations of about 60 and 250 feet from the left abutment of the dam.

- 30
- 2) Investigate the cause of the soft, wet area next to the downstream toe in the deepest section of the valley.
 - 3) Investigate the erosion and sloughing which has taken place on the east side of Ilion Gorge and the deterioration of the erosion protection there, caused by the discharge of water from the drainage ditch that is located along the south and west sides of the reservoir.
 - 4) Investigate the spring house which is located 40 feet from the downstream toe of the dam to determine if there is any potential for the initiation of piping at the spring house.

Any remedial work deemed necessary as a result of these investigations should be completed within 18 months after receipt of this report by the Owner. A qualified, registered professional engineer should design and observe the construction of any necessary remedial work.

The following remedial work should be completed by the Owner within 12 months after his receipt of this report. Where engineering assistance is indicated, the Owner should engage a qualified registered professional engineer. Assistance by such an engineer may also be useful for some of the other work.

- 1) Institute a program to visually inspect - not just casually look at - the dam and its appurtenances at least once a month.
- 2) Clear brush and small trees from the drainage ditch that is the discharge channel for the auxiliary spillway. Continue to keep this ditch clear by cutting and cleanup at least annually.
- 3) Remove trees, brush, and their root systems from the slopes of the embankment and to a distance of 20 feet downstream from the toe in accordance with specifications and field observation of the work by an engineer. Fill resulting holes with properly selected, compacted fill. Continue to keep these same areas and the crest of the dam clear by cutting, mowing, and cleanup at least annually.
- 4) Backfill animal burrows on the slopes of the embankment with properly selected, compacted fill.
- 5) Prepare written routine operation and maintenance procedures for the dam and its appurtenances.
- 6) Institute a program of comprehensive technical inspection of the dam and its appurtenances by an engineer on a periodic basis of at least once every two years.

- 7) Develop an emergency action plan outlining action to be taken to minimize the downstream effects of an emergency, together with an effective warning system.



& LAND SURVEYOR

Approved by:

Date:

Kenneth J. Male
President
C. T. Male Associates, P.C.
NY PE 25004

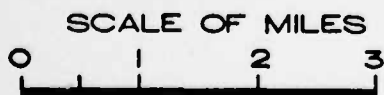
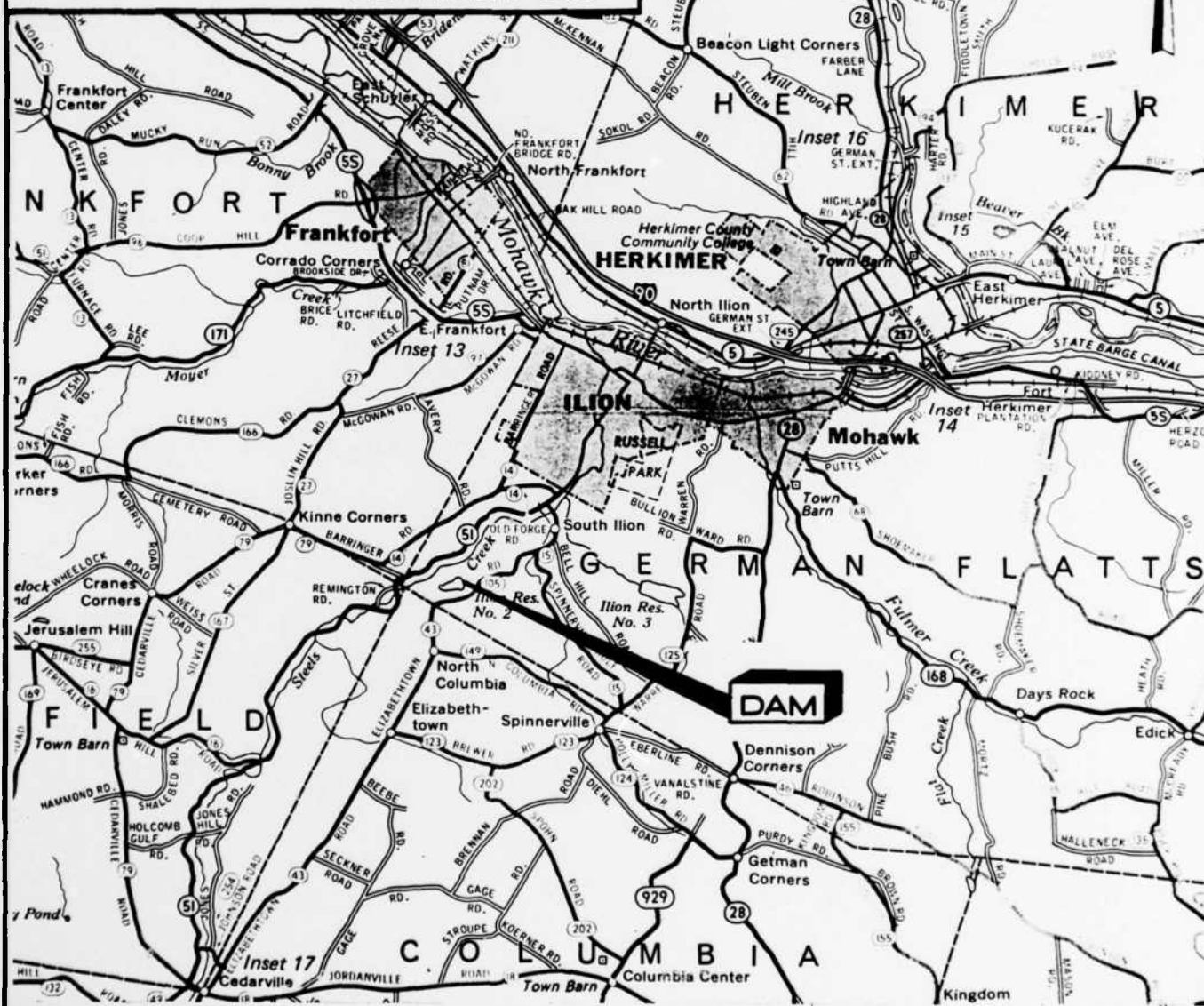
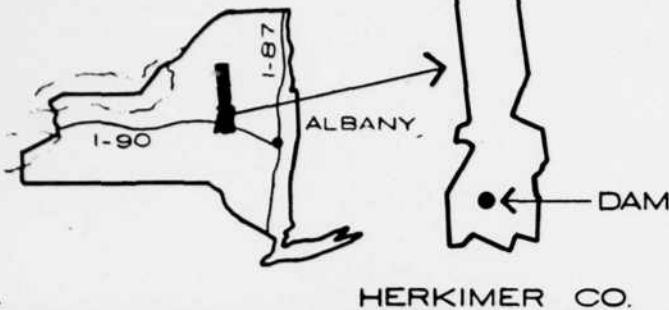
Col. W. M. Smith, Jr.
New York District Engineer
Corps of Engineers

31 Aug 81



Overview Photo - Ilion Reservoir No. 2 Dam from road near right abutment - 6/4/81

NEW YORK STATE



BASE MAP: HERKIMER CO.
HIGHWAY MAP - 1978

PROJECT NO. 58.01.006/80.846

ILION RESERVOIR NO. 2 DAM VICINITY MAP

TOWN OF GERMAN FLATTS HERKIMER CO., NY
SCALE: 1" = 1.5 MILES DATE JANUARY 1981



C. T. MALE ASSOCIATES, P. C.

3000 TROY ROAD, SCHENECTADY, N.Y. 12309

PROFESSIONAL ENGINEERS LAND SURVEYORS AND PLANNING CONSULTANTS

13
NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

NAME OF DAM: ILION RESERVOIR NO. 2 DAM, ID NO. NY 00185

SECTION 1

PROJECT INFORMATION

1.1 GENERAL

a. Authority

The National Dam Inspection Act, Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New York District of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within New York State. C. T. Male Associates, P.C., has been retained by the New York District to inspect and report on selected dams in the State of New York. Authorization and notice to proceed was issued to C. T. Male Associates, P.C., under a letter from Michael A. Jezior, LTC, Corps of Engineers. Contract No. DACW51-81-C-0014 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

The purpose of the inspection program is to perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public, and thus permit correction in a timely manner by non-Federal interests.

1.2 DESCRIPTION OF PROJECT

a. Location

The dam is located offstream of an unnamed tributary of Steele Creek about 1.5 miles southwest of the Village of Ilion. The dam at its maximum section is at Latitude 42 degrees - 59.2 minutes North, Longitude 75 degrees - 3.9 minutes West.

Access to the dam is from Interstate 90 (New York State Thruway) to the north, then west via State Route 5S to the Village of Ilion, then south from Ilion via State Route 51 to Spinnerville Gulf Road (County Route 15), then south via Elizabethtown Road (County Route 105) to the dam. The dam and reservoir are located on the west side of the road (see Vicinity Map, and Drainage Area Map Appendix C-5).

03 The official name of the dam is Ilion Reservoir No. 2 Dam and the official name of the impoundment is Ilion Reservoir No. 2.

b. Description of Dam and Appurtenances

Ilion Reservoir No. 2 Dam is an earthen embankment about 60 feet high, 800 feet long, and 20 feet wide at the crest. The upstream and downstream slopes of the dam are about 1.2H:1V and 1.5H:1V, respectively. No information is available as to the nature of the soils in the embankment or in the foundation of the dam. About 300 feet of the perimeter of the reservoir next to the left abutment is within about 50 feet of the Ilion Gorge.

Near the right abutment of the dam there is a service spillway. The service spillway consists of a 12-inch-diameter cast iron inlet pipe into a 5-foot-diameter concrete vault with a manhole cover. Flow from the inlet pipe enters a 2-foot-diameter wood stave upflow well in the center of the vault and discharges over the rim of the wooden well. Flow then exits the vault via a 10-inch-diameter cast iron pipe which discharges into a ditch near Elizabethtown Road about 250 feet downstream of the right end of the dam.

At the end of the reservoir opposite the dam there is an auxiliary spillway. The auxiliary spillway consists of a 4.5-foot-long concrete ogee weir crest which discharges into an 18-inch-diameter corrugated metal pipe, 15 feet long, just downstream. This pipe discharges into a ditch at the end of the reservoir. The ditch discharges to a concrete headwall and pipe section at the top of Ilion Gorge and then down the Gorge in an eroded channel paved with concrete matting.

At the downstream toe of the dam there is a concrete gate house with a wood-framed, slate-shingled roof. Inside the gate house there are 2 valves on the 10-inch-diameter outlet pipe from the dam to Ilion Reservoir No. 1 (12-inch pipe through gate house) and one valve on the 12-inch-diameter blowoff pipe which discharges downstream of the dam. Another valve on the outlet pipe is located downstream of the gate house buried under a standard valve box.

Inflow to the reservoir is mainly through two raw water supply lines, one 8 inches in diameter and one 6 inches in diameter, both fed by intakes on streams south of the reservoir. These supply lines can be regulated at the reservoir, at the intakes, or at a valve on each line located at an intermediate point. The 6-inch supply line to the reservoir is normally closed.

c. Size Classification

In accordance with Recommended Guidelines (Reference 1), Ilion Reservoir No. 2 Dam is classified as "intermediate" in size

because its height is about 60 feet (within the 40 to 100-foot range). The maximum storage capacity at top of dam is 251 acre-feet.

d. Hazard Classification

In accordance with Recommended Guidelines (Reference 1), Ilion Reservoir No. 2 Dam is classified as having a "high" hazard potential. This is because it is judged that failure of the dam would significantly increase flows downstream which could cause loss of more than a few human lives and appreciable property damage. Downstream development that could be damaged or destroyed by a dam failure includes: a dwelling about 200 feet downstream of the dam on the right and many more dwellings starting about 500 feet downstream and located along Elizabethtown Road (vertical drop from the dam to the start of these dwellings is about 60 feet); portions of Elizabethtown and Spinnerville Gulf Roads (County Routes 105 and 15, respectively); and the hamlet of South Ilion, with many dwellings, through which the unnamed tributary of Steele Creek runs about one mile downstream of the dam (vertical drop from the dam to the hamlet is about 300 feet).

e. Ownership

The dam was originally constructed for the present owner in 1903. The dam and reservoir are owned by:

Village of Ilion Board of Water Commissioners
P.O. Box 330
Morgan Street
Ilion, NY 13357

Attn: Charles R. Baker, Water Superintendent
(315) 895-7711

f. Operator

Day-to-day operation of the dam is the responsibility of the Village Water Department. The heads of the department are the following:

Charles R. Baker, Water Superintendent
Edward C. Allston, Assistant Water Superintendent
(same address and phone as Owner above, for both)

g. Purpose of Dam

The dam was originally constructed as a raw water supply impoundment for the Village of Ilion. It is still used for this purpose.

h. Design and Construction History

The dam was constructed in 1903 for the Village of Ilion. The designer was Knight and Hopkins, Rome, New York, who are no longer

in business. Data concerning the original design can be found in Appendices F2, F3, and G. The dam was built by the Marsden Construction Company, Utica, New York, and their business status is unknown.

04 In the early 1950's the 12-inch tile pipe from the service spillway was replaced with a 10-inch cast iron pipe. In about 1963 the gate valve downstream of the gate house on the outlet pipe to Reservoir No. 1 was installed. In the 1970's the auxiliary spillway discharge channel was partially paved with concrete matting and drainage work was undertaken at the end of the reservoir opposite the dam.

There is no knowledge or record of other construction, modification, or major repair of the dam. Refer to Section 2 of this report, as well as to the Engineering Data Checklist in Appendix F2, for a complete discussion of the design and construction history. Selected plans and other engineering data are included in Appendices F3 and G.

i. Normal Operating Procedures

The dam site is visited daily by Water Department personnel who measure the water in the reservoir at the service spillway vault.

All of the valves on the outlet pipe at the dam are normally open and the blowoff is usually closed. The water level is usually at about the service spillway crest. The 8-inch raw water supply pipe to the reservoir is normally open and the 6-inch one is normally closed.

1.3 PERTINENT DATA

a. <u>Drainage Area</u> (acres)	19
b. <u>Discharge at Dam Site</u> (cfs)	
Service Spillway (W.S. at top of dam)	5
Auxiliary Spillway (W.S. at top of dam)	15
Total Both Spillways (W.S. at top of dam)	20
Outlet Pipe (maximum flow to Reservoir No. 1)	1.5
Blowoff (normally closed - estimated potential w/W.S. at service spillway crest)	25
Maximum Known Flood	Unknown

c. Elevation (feet - NGVD)

All elevations are based on an elevation for the top of dam as found on a 1903 design/construction drawing of the service spillway by Knight and Hopkins (see Appendix G-1) and are assumed to be in feet above mean sea level NGVD (National Geodetic Vertical Datum of 1929). The elevations appear consistent with current USGS mapping.

	Top of Dam	920
	Design High Water	Unknown
	Auxiliary Spillway Crest	916.8
	Service Spillway Crest	916
	Entrance Invert of Outlet Pipe and Blowoff	871 ±
d.	<u>Reservoir Length (feet) - at service spillway crest</u>	1200±
e.	<u>Reservoir Surface Area (acres)</u>	
	Top of Dam	14.5
	Auxiliary Spillway Crest	12 +
	Service Spillway Crest	11.4
f.	<u>Reservoir Storage (acre-feet)</u>	
	Top of Dam	251
	Auxiliary Spillway Crest	209
	Service Spillway Crest	199
g.	<u>Dam</u>	
	Type - Earthen embankment.	
	Length - About 800 feet.	
	Height - About 60 feet.	
	Top Width - About 20 feet.	
	Side Slopes - Upstream - About 1.2H:1V.	
	- Downstream - About 1.5H:1V.	
	Zoning - Unknown.	
	Impervious Core - Unknown.	
	Cutoff - Unknown.	
	Grout Curtain - Unknown.	
h.	<u>Spillway</u>	
	1) <u>Service Spillway</u>	
	Type - Upflow well with 10-inch-diameter outlet pipe.	
	Length of Weir - N/A.	
	Upstream Channel - 12-inch cast iron pipe from reservoir to 5-foot-diameter vault with 2-foot-diameter wood stave upflow well in center.	
	Downstream Channel - Outlet pipe from vault discharging to ditch downstream of right end of dam.	
	2) <u>Auxiliary Spillway</u>	
	Type - Concrete ogee weir crest with 18-inch-diameter outlet pipe to ditch downstream of weir.	
	Length of Weir - 4.5 feet, but controlled by 18-inch outlet pipe.	
	Upstream Channel - Reservoir up to weir crest. Pipe downstream of weir is 10 inches lower than weir crest.	

Downstream Channel - Narrow ditch from pipe widening at concrete headwall at top of Ilion Gorge. Pipe section through headwall discharging to concrete-mat-paved channel down gorge slope.

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i. Outlet Works

1) Outlet Pipe

Size - 10-inch diameter (12-inch diameter through gate house).

Description - Cast iron pipe from reservoir down to Ilion Reservoir No. 1.

Control - 2 valves in gate house normally open and not used. One valve just downstream of gate house in valve box usually operated (downstream of toe). Also, other valves on line down at Ilion Reservoir No. 1.

2) Blowoff

Size - 12-inch diameter.

Description - Cast iron pipe discharging into 15-inch CMP which in turn discharges into a ditch downstream of dam. Can apparently act as low level drain.

Control - Valve in gate house.

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SECTION 2

ENGINEERING DATA

2.1 DESIGN DATA

a. Geology

There was no geologic information available in the data for this dam. The following information was obtained from current geologic maps and publications for this region (References 26 and 27), as well as from the site visit.

Ilion Reservoir No. 2 Dam is located in the southern New York Section of the Appalachian Plateaus Province and lies on the northern slope of the dissected plateaus of that province. Bedrock in the vicinity of the reservoir consists of shales and siltstones of Upper Ordovician age. No maps are available showing the surficial geology.

b. Subsurface Investigations

No records of subsurface investigations are available for this site.

c. Dam and Appurtenances

The dam was designed in 1903 by Knight and Hopkins of Rome, New York, who are no longer in business. Some data concerning the original design can be found in Appendices F2, F3, and G.

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2.2 CONSTRUCTION HISTORY

a. Initial Construction

The dam was constructed in 1903 by the Marsden Construction Company, Utica, New York, whose present business status is unknown. No records concerning the actual construction of the dam are known to exist. The construction contract and specifications (see Appendix F3-1) do, however, describe the way the dam was to be constructed. Some old design/construction drawings of the dam and reservoir were also found (see Appendix G-1 to G-3).

A brief review of the construction history, as can be determined from the available data and the Owner, can be found on Appendix F2-2.

b. Modifications, Repairs, and Maintenance

In the early 1950's the 12-inch tile pipe from the service spillway was replaced with a 10-inch cast iron pipe. In

about 1963 the gate valve downstream of the gate house on the outlet pipe to Reservoir No. 1 was installed. In the 1970's the auxiliary spillway discharge channel was partially paved with concrete matting and drainage work was undertaken at the end of the reservoir opposite the dam.

There is no knowledge or record of other construction, modification, or major repair of the dam.

c. Pending Remedial Work

There are no known plans for any remedial work at the dam.

2.3 OPERATION RECORD

a. Inspections

There is no known record of inspection of the dam by the Owner.

The only inspection report found for the dam was one done by the NYS-DEC, dated October 19, 1971 (see Appendix F3-30). The report noted that the auxiliary spillway needed major repairs and that trees grew on the downstream slope. The report also noted that the dam received periodic maintenance.

b. Performance Observations

Other than the observations made in the one inspection report found (see Appendix F3-30), there are no other known records of performance observations.

c. Water Levels and Discharges

Water Department personnel measure water levels in the service spillway vault daily. These readings are recorded on the daily water system reports and are available from 1948 to present. Rainfall is measured from the period of April to November at a nearby Village Reservoir (Ilion Reservoir No. 1). The measurements are taken by the Water Plant Operator and are also available from 1948 to present.

d. Past Floods and Previous Failures

There are no known past floods at or previous failures of the dam. The Water Superintendent did indicate that he had never seen the reservoir level reach the auxiliary spillway crest in his 33 years with the Water Department.

2.4 EVALUATION

a. Availability

As listed on Appendix F1, various engineering data and records are available in the files of the Owner and the Dam Safety Section of the NYS-DEC. This data was reviewed, and copies of the records significant to the dam are included in chronological order in Appendices F3 and G. Appendix F2, Checklist for General Engineering Data and Interview with Dam Owner, also contains pertinent engineering information.

b. Adequacy

Available data consisted of the construction contract and specifications, some design/construction drawings, an inspection report, and data from the Owner on the dam and its history. Such data as design calculations, complete design drawings, record drawings, complete data on foundation and embankment soils, and operation and performance data were not available. The lack of such in-depth engineering data does not permit a comprehensive review. Therefore, the available data was not adequate by itself to permit an assessment of the dam.

c. Validity

Based on field observation and checking, some of the limited data available is not valid.

The original outlet pipe from the service spillway vault was replaced with a 10-inch diameter cast iron pipe with its invert set at about the crest of the upflow well (spillway crest). The 1903 design/construction drawing (see Appendix G-1) shows the original 12-inch tile outlet pipe set about 2.5 feet lower at about the bottom of the spillway vault.

Field measurements indicate that the service spillway crest is about 4 feet lower than top of dam. The 1903 design/construction drawing (see Appendix G-1) shows the service spillway crest 1 foot lower at 5 feet below top of dam.

Field measurement indicates that the crest of the auxiliary spillway is 4.5 feet long, whereas the 1903 design/construction drawing (see Appendix G-1) shows it to be only 4 feet long. Similarly, the outlet pipe from the auxiliary spillway is 18-inch-diameter corrugated metal pipe, whereas the 1903 drawing shows 12-inch tile.

SECTION 3

VISUAL INSPECTION

3.1 FINDINGS

a. General

Ilion Reservoir No. 2 Dam was inspected on June 4, 1981. The inspection party (see Appendix B-1) was accompanied by Mr. Charles Baker, Water Superintendent, and Mr. Edward Allston, Assistant Water Superintendent, both representing the Owner. The weather was cloudy and cool, with light rain occurring around noon. The water surface was at about the service spillway crest, EL 916, at the time of the inspection. The Visual Inspection Checklist is included as Appendix B, while selected photos taken during the inspection are included as Appendix A and as the Overview Photo at the beginning of this report. Appendix A-1 is a photo index map.

b. Dam

There were no major sloughs or slides evident on the embankments. Two scarps, however, were found on the Ilion Gorge side of the narrow area of natural ground along the shore of the reservoir, 60 and 250 feet from the left abutment.

Crest - The crest of the dam is covered with grass which is kept mowed. Vehicles are driven on the crest of the dam and have produced a pair of wheel tracks on which there is only a sparse cover of grass (see Photo A-2A). Some roots from trees growing near the top of the downstream slope extend across the entire width of the crest.

Upstream Slope - The upstream slope of the dam is riprapped up to an elevation about 2 feet above the reservoir level. Low brush and weeds cover the slope above the level of the riprap. The upstream slope of this dam is also 1.2H:1V, which is considerably steeper than the upstream slope of similar dams designed in accordance with modern standards of practice.

Downstream Slope - The downstream slope of this dam is 1.5H:1V, which is considerably steeper than the downstream slope of similar dams designed in accordance with modern standards of practice. The downstream slope is covered with large evergreen trees, up to about 18 inches in diameter (see Overview Photo). One animal burrow was observed, at about Station 5+00, ten feet above the toe of the slope. No evidence of seepage was observed on the downstream slope itself.

Zone Next to Downstream Toe - In the deepest part of the valley, between about Stations 3+50 and 4+50, there is a soft, wet area, covered with brambles and weeds, next to the downstream toe

19 of the dam (see Photo A-2B). Elsewhere, there are trees growing in the zone next to the toe. At about Station 3+00, there is a spring house on natural ground about 40 feet from the toe of the dam and about 20 feet below the elevation of the top of the dam (see Photo A-3A).

Abutments - Both abutments appear to be soil. No bedrock outcrops were observed in the vicinity of the dam. The contact between the downstream slope and the right abutment is covered with brambles and weeds and cannot be inspected adequately.

c. Appurtenant Structures

1) Reservoir Supply Lines

The reservoir raw water supply lines were not observable. According to the Water Superintendent, both lines, an 8-inch and 6-inch, are operable with the 6-inch line normally closed. All of the upstream intakes have operable control valves and there are 2 operable valves in series on each supply line as well.

2) Gate House, Outlet Pipe, and Blowoff

The gate house (see Photo A-3B) is a concrete structure with a wood-framed, slate-shingled roof. There is minor spalling and cracking of its surface concrete and the door and lock were broken.

The outlet pipe is a 10-inch-diameter cast iron pipe (12-inch-diameter pipe through the gate house) from the reservoir to Ilion Reservoir No. 1 downstream. The pipe was not observable. There are 2 valves on the pipe inside the gate house (see Photos A-4A and A-4B). These valves are normally kept open and are not operated. There is also a valve on the outlet pipe downstream of the gate house in a valve box (see Photo A-3B). This valve is in good condition and also is usually open. Outflow from Ilion Reservoir No. 2 is normally controlled by valves downstream at Reservoir No. 1.

The blowoff is a 12-inch-diameter pipe with a control valve in the gate house (see Photos A-4A and A-4B). The valve is operable, used regularly, and leaks somewhat when fully closed. The pipe discharges into a culvert and then a ditch downstream from the toe of the dam (see Photo A-5A).

3) Service Spillway

8166 The service spillway consists of a 12-inch inflow pipe, a 5-foot-diameter concrete vault with a 2-foot-diameter wood stave upflow well, and a 10-inch-diameter cast iron outflow pipe. The inflow pipe is unobservable. Photo A-5B shows the concrete vault with the wood stave upflow well. The concrete vault is in good condition while the wood stave upflow well in it appears deteriorated. The upstream end of the outflow pipe is rusted but in good condition. The downstream end of the outflow pipe (see Photo

A-6A) is free from obstructions and discharges to a ditch about 250 feet downstream of the dam near Elizabethtown Road.

4) Auxiliary Spillway

The auxiliary spillway consists of a concrete structure with a 4.5-foot-long ogee weir crest that discharges into a 15-foot-long section of 18-inch-diameter corrugated metal pipe (see Photos A-6B and A-7A). The weir structure concrete is weathered and stained. The 18-inch pipe from it is laid level and in good condition.

The 18-inch pipe discharges into a ditch, which leads to a concrete headwall and 30-inch asphalt-coated corrugated metal pipe discharging at the top of Ilion Gorge (see Photos A-8A and A-9A). The narrow ditch to the headwall is choked with brush and small trees (see Photo A-7B). The ditch has some riprap and concrete paving which are in poor condition and it is eroded in some areas. The headwall and pipe through the wall are in good condition.

d. Reservoir Area

No evidence was observed to indicate problems of slope stability on the perimeter of the reservoir or of significant sedimentation in the reservoir (see Photo A-9B).

e. Downstream Channel

No water (except from the blowoff) is discharged from the reservoir directly into the valley across which the dam is built, and hence, there is no downstream channel as such. The outflow pipe from the service spillway discharges into a ditch near Elizabethtown Road about 250 feet downstream of the right end of the dam.

At the west end of the reservoir opposite the dam there is an auxiliary spillway which, as previously discussed, discharges into a drainage ditch that is located just beyond the south and west perimeter of the reservoir. This drainage ditch, in turn, passes through a culvert pipe (with headwall) and discharges into Ilion Gorge (see Photo A-9A). The water discharging from the ditch has caused extensive erosion and sloughing in the soils on the side of the gorge (see Photo A-8A). The concrete matting along the slope used for erosion protection has also broken up, displaced, and washed downstream in places (see Photo A-8B).

Between the left abutment of the dam and the point where the drainage ditch discharges, there is a strip of natural ground between the reservoir and Ilion Gorge. For a distance of about 300 feet from the left abutment, this strip of natural ground is only 40 to 65 feet wide and is no higher than the top of the dam. At two locations, respectively 60 and 250 feet from the left abutment, there are erosion scarps, about 5 feet high and at an elevation 25 feet below the elevation of the top of the dam, on the Ilion Gorge side of this strip. These scarps appear to be due to

erosion by groundwater which discharges on the slope. In the first of these scarps, seepage was actively discharging at the time of the inspection; in the second, there was no active seepage discharge. Because the strip of natural ground between the reservoir and Ilion Gorge is narrow, it is likely that the groundwater is flowing from the reservoir. The side slope of the Ilion Gorge averages about 1.2H:1V in the area where the scarps are located.

3.2 EVALUATION

The upstream slope of this dam is 1.2H:1V and the downstream slope of this dam is 1.5H:1V, both of which are considerably steeper than the slopes of similar dams designed in accordance with modern standards of practice.

Large trees growing on the downstream slope of the dam and in the zone next to the downstream toe could cause seepage and piping (internal erosion) problems if a tree blows over and pulls out its roots or if a tree dies and its roots rot.

A soft, wet area next to the downstream toe of the dam may indicate a seepage problem which, if not controlled, could adversely affect the stability of the dam.

A spring house on natural ground about 40 feet downstream from the toe of the dam might become a focus for piping through the foundation of the dam, depending on the details of its construction and the character of the natural ground in which the spring is dug.

Seepage and erosion from the east bank of Ilion Gorge close to the perimeter of the reservoir, if not controlled, could result in breaching of the strip of natural ground between the reservoir and the gorge.

Erosion and sloughing of the east bank of Ilion Gorge and the deterioration of erosion protection there, caused by the discharge of water from the drainage ditch that is located along the south and west sides of the reservoir, should be evaluated to determine whether it poses any long-term problems with respect to the reservoir or the downstream area in the gorge.

19 An animal burrow on the downstream slope of the dam could become a focus for seepage and piping of the embankment.

Brush and small trees in the drainage ditch which is the discharge channel for the auxiliary spillway could hinder flow from the auxiliary spillway.

Brush on the upstream slope, which appears to have been cut periodically in the past, should not be allowed to grow large enough to cause any problems.

SECTION 4

OPERATION AND MAINTENANCE PROCEDURES

4.1 OPERATION PROCEDURES

There are no written operation procedures for the dam.

Ilion Reservoir No. 2 is used as part of the public water supply for the Village of Ilion. All the valves on the outlet pipe at the dam are normally open and the blowoff is usually closed. The water level is usually at about the service spillway crest. The 8-inch raw water supply pipe to the reservoir is normally open and the 6-inch one is normally closed. The maximum daily outflow from the reservoir is reported to be about 1.0 mgd (about 1.5 cfs).

At the time of the inspection the reservoir level was at about the service spillway crest.

4.2 MAINTENANCE OF DAM AND OPERATING FACILITIES

There are no written maintenance procedures for the dam.

The dam site is visited daily by Water Department personnel who measure the water in the reservoir at the service spillway vault. The grass on the dam crest and around the reservoir is mowed about every 2 weeks. Brush is cut off the riprap annually. Some tree thinning and dead tree removal is done around the reservoir, excluding the dam, annually.

Prior to winter the reservoir is drawn down about a foot by opening the blowoff and/or closing the supply lines. The reservoir is drawn down to prevent ice damage to the riprap. The reservoir is refilled in the spring.

Every month the blowoff is opened to wash sediment out of the reservoir. It may run for days and the reservoir level may drop one or two feet while the blowoff is open.

The valves on both raw water supply lines are exercised regularly. The supply valves at the reservoir are exercised once a year and those at the intakes are exercised 3 or 4 times a year. The 8-inch supply line valve upstream of the reservoir (intermediate valve) is exercised 2 or 3 times a year while the 6-inch supply line valve upstream of the reservoir is not exercised since this line is not used to feed the reservoir regularly. Some valves on the outlet pipe and the blowoff valve are used regularly.

20 4.3 EMERGENCY ACTION PLAN AND WARNING SYSTEM

There is no emergency action plan and warning system for the dam.

4.4 EVALUATION

Maintenance of the dam and appurtenances is generally satisfactory. The erosion of the auxiliary spillway discharge channel (ditch down Ilion Gorge) and the growth of trees on the dam should, however, be remedied. The operation and maintenance procedures should be organized in writing for ready reference.

The Owner should develop an emergency action plan outlining action to be taken to minimize the downstream effects of an emergency, together with an effective warning system.

SECTION 5

HYDROLOGY AND HYDRAULICS

5.1 DRAINAGE AREA CHARACTERISTICS

Ilion Reservoir No. 2 and its dam are located about 300 feet offstream of an unnamed tributary of Steele Creek. Steele Creek drains to the north and discharges into the Mohawk River about 3 miles from the dam site.

The total drainage area at the dam is 0.03 square miles (19 acres), of which about 60% (11.4 acres) is actual reservoir surface at the service spillway crest. The actual drainage area tributary directly to the reservoir is very small because of a ditch on the south and west sides of the reservoir which intercepts most runoff and carries it away from the reservoir. The area that drains directly to the reservoir is very flat and consists of land less than 100 feet from the reservoir, for the most part. (See Appendices C-5 and C-6).

5.2 ANALYSIS CRITERIA

The U.S. Army Corps of Engineers Hydrologic Engineering Center's Program HEC-1 DB (Reference 3) was used to develop the test flood hydrology and perform the reservoir routing.

The purpose of this analysis was to evaluate the dam and its spillways with respect to their surcharge storage and spillway capacity. Accordingly, it was assumed that the water surface was at the service spillway crest at the start of the flood routing. It was also assumed that the supply pipes to the reservoir and the outlet and blowoff pipes from it were closed, since their capacities are small and all can be controlled by Water Department personnel.

If the supply pipes (6-inch and 8-inch) were assumed open throughout the flood, it is considered that their inflow would be approximately matched by outflow through the 10-inch outlet pipe. Also, the 12-inch blowoff could be operated to provide additional discharge capacity in an emergency. Therefore, the result would be about the same - or even better - than for the completely closed condition of the supply and outlet works as modeled.

A constant base flow of 2 cfs per square mile was chosen to represent average conditions in the drainage area and was inputted into the program for the subarea.

The index PMP (probable maximum precipitation) inputted to the HEC-1 DB program was 19.2 inches for a 24-hour duration all-season storm over a 200-square-mile basin, according to HMR 33 (Reference 4). Maximum 6-hour, 12-hour, 24-hour, and 48-hour precipitation for the actual size of the drainage area (same for 10 square miles or less)

were inputted to the program as percentages of the index PMP in accordance with HMR 33. A storm reduction coefficient was then applied internally by the program in order to transpose or center the storm over the actual total drainage area. Thus, the corrected 48-hour PMP for the actual total drainage area became 21.8 inches. All rainfall was distributed using the Standard Project Storm arrangement embedded in the program.

Appendix C-7 summarizes the subarea, loss rate, and unit hydrograph data inputted to the program. Only one subarea was used and it consisted of all of the drainage area around the reservoir, plus the reservoir surface itself. Since the subarea consisted of mostly reservoir surface it was very conservatively assumed that all rainfall would become runoff. The loss rates were set to zero so that rainfall would equal rainfall excess, or runoff. Assuming no delay in the rainfall/runoff response, a constant unit hydrograph for a rainfall duration equal to the HEC-1 DB calculation interval was developed per Appendix C-7 and inputted to the program.

The floods selected for analysis were the PMF (probable maximum flood) and 1/2 PMF. Floods as ratios of the PMF (e.g., 1/2 PMF) were taken as ratios of runoff, not of precipitation. Peak inflow for the PMF is about 335 cfs or 11,167 csm (cfs per square mile). Peak outflow is reduced by reservoir routing to about 14 cfs (467 csm). For 1/2 PMF the peak inflow is about 168 cfs (5,600 csm) and the routed peak outflow is about 5 cfs (167 csm).

5.3 RESERVOIR CAPACITY

Storage capacity data for the reservoir was developed using USGS contour mapping (see Appendix C-5) and a known capacity at the service spillway crest, EL 916, of 199 acre-feet (65 million gallons, see Appendix F3-35). Area measurements inside contour elevations were obtained from the USGS mapping, and the capacity of the reservoir at various elevations was then computed by hand using the method of conic sections. The computations appear on Appendix C-6.

At the service spillway crest, EL 916, the reservoir has a capacity of 199 acre-feet. At the top of dam, EL 920, the reservoir has a capacity of 251 acre-feet. Surcharge storage between the service spillway crest and top of dam amounts to 52 acre-feet, or about 2.7 feet of runoff from the total 19-acre drainage area. Therefore, the reservoir has the capacity to attenuate all of the peak inflow.

5.4 SPILLWAY CAPACITY

The dam has a service spillway that consists of a pipe from the reservoir to a vault with a 10-inch-diameter cast iron outlet pipe which controls the spillway outflow. The dam also has an

auxiliary spillway which consists of a 4.5-foot-long ogee crest upstream of an 18-inch diameter corrugated metal pipe.

The discharge capacity of the service spillway was taken to be the capacity of the inlet of the 10-inch outflow pipe, modeled as an orifice with free discharge. The service spillway discharge computations are presented on Appendix C-8. With water 4 feet over the pipe invert (i.e., water level at top of dam) the service spillway discharges about 5 cfs.

The discharge capacity of the auxiliary spillway was taken to generally be the capacity of the inlet of the 18-inch culvert downstream of the weir crest, modeled as an orifice with free discharge. The auxiliary spillway discharge computations are presented on Appendix C-8. With water 3.2 feet over the weir crest upstream of the culvert (i.e., water level at top of dam) the auxiliary spillway discharges about 15 cfs.

For the service spillway crest at EL 916, the auxiliary spillway weir crest at EL 916.8 (culvert invert at about EL 916), and the top of dam at EL 920, total discharge computations are summarized on Appendix C-9. Total discharge from the dam is the sum of discharges from the two spillways, plus flow over the dam for the overtopping condition. As discussed previously in Section 5.2, the supply pipes to and the outlet and blowoff pipes from the reservoir were all assumed to be closed. The sum of the hand-computed discharges for the two spillways were inputted directly to the HEC-1 DB program.

With the reservoir level at top of dam, EL 920, the total discharge from the reservoir is just the capacity of the two spillways, or about 20 cfs.

5.5 FLOODS OF RECORD

There are no known records of past flood discharges at the dam. As noted in Section 2.3d, the Water Superintendent did indicate that he had never seen the reservoir level reach the auxiliary spillway crest in his 33 years with the Water Department.

5.6 OVERTOPPING POTENTIAL

The results of the overtopping analysis using the HEC-1 DB program are summarized in Table 5.1. The overtopping analysis computer input and output for the PMF and 1/2 PMF are included starting on Appendix C-10.

As noted from Table 5.1, the PMF does not overtop the dam but results in minimum freeboard of about 1.8 feet. 1/2 PMF results in minimum freeboard of about 2.8 feet. Peak inflows are 335 cfs for the PMF and 168 cfs for 1/2 PMF. Peak outflows are greatly reduced by reservoir routing to 14 cfs for the PMF and 5 cfs for 1/2 PMF.

TABLE 5.1

ILION RESERVOIR NO. 2 DAM

OVERTOPPING ANALYSIS

CONDITIONS

Total Drainage Area = 0.03 square miles (reservoir = 0.02 sq. mi.)
 Start Routing at Service Spillway Crest EL 916
 Top of Dam EL 920
 Total Project Discharge Capacity at Top of Dam = 20 cfs \pm
 due to service and auxiliary spillways. Outlet pipe
 and blowoff assumed closed.
 Some values rounded from computer results.

	PMF	1/2 PMF (a)
<u>INFLOW</u>		
48-hour Rainfall (inches)	21.8	10.9 (b)
48-hour Rainfall Excess (inches) (c)	21.8	10.9 (d)
Peak Inflow (cfs)	335	168
(csm)	11,167	5,600
<u>OUTFLOW</u>		
Peak Outflow (cfs)	14	5
(csm)	467	167
Time to Peak Outflow (hours)	42.2	42.2
Maximum Storage (acre-feet)	228	214
Max. W.S. Elevation (feet-NGVD)	918.2	917.2
Minimum Freeboard (feet)	1.8	2.8
Maximum Depth over Dam (feet)	not overtopped	not overtopped
Duration of Overtopping (hours)	n/a	n/a

- (a) One-half of PMF total runoff, including base flow. For PMF base flow = 2 cfs per square mile = <1 cfs.
 (b) Approximation assuming total losses are the same as for the PMF
 (c) Rainfall Excess = Rainfall for the total drainage area. Losses are assumed to be zero.
 (d) Equal to one-half of PMF value.

Time to maximum stage, or the time from the start of the 48-hour storm to peak outflow, is about 42 hours for both floods. The peak portion of the inflow and outflow hydrographs for the PMF and 1/2 PMF are shown by the computer plots on Appendices C-15 and C-16.

It should be noted that ground along the west end of the reservoir, opposite the dam and near the auxiliary spillway, is at about EL 918, or about 2 feet lower than the top of dam (based on field measurement). Therefore, it appears that the PMF would overtop this low ground by about 0.2 of a foot, while the 1/2 PMF would leave about 0.8 of a foot of freeboard. It is considered that this small overtopping of the low area opposite the dam by the PMF would not threaten the safety of the dam.

5.7 EVALUATION

The dam would not be overtopped by the PMF. Therefore, in accordance with Corps of Engineers' screening criteria for review of spillway adequacy, spillway capacity is considered "adequate".

SECTION 6

STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The following visual observations, which are discussed in detail in Section 3, are indicative of potential long-term stability problems at the Ilion Reservoir No. 2 Dam:

- 1) Steepness of the upstream and downstream slopes.
- 2) Large trees growing on the downstream slope and in the zone next to the downstream toe of the dam.
- 3) A soft, wet area next to the downstream toe of the dam in the deepest section of the valley.
- 4) A spring house on natural ground about 40 feet downstream from the toe of the dam.
- 5) Seepage and erosion on the Ilion Gorge side of a narrow strip of natural ground between the reservoir and the Gorge.
- 6) Erosion and sloughing of the east bank of Ilion Gorge where water discharges from the drainage ditch that is located along the south and west sides of the reservoir.
- 7) An animal burrow on the downstream slope of the dam.
- 8) Brush growing on the upstream slope of the dam, if it is allowed to grow too large.

The upstream slope of the dam is about 1.2H:1V and the downstream slope of the dam is about 1.5H:1V, both of which are considerably steeper than the slopes of similar dams designed in accordance with modern standards of practice. An analysis of the stability of the embankment should be made to determine whether it has an acceptable factor of safety against slope failure.

b. Design and Construction Data

The contract and specifications for construction of the dam (see Appendices F3-1 to F3-29) require that: "the inner half of the main embankment shall be composed of selected material...and such material shall not have to exceed twenty-five percent of small stones and gravel equally distributed. All embankment material will be required spread in six inch layers...and solidified, to the

satisfaction of the engineer or inspector, with a heavy grooved roller, weight not less than seven hundred pounds to the lineal foot." No construction data are available to indicate what type of material was actually used in the embankment.

The construction contract also requires that: "the slope walls of the ...side embankments shall be twelve inches thick, one stone deep, laid dry and solidly bedded...(and) shall all be backed with nine inches of gravel or quarry chips." The stone facing on the upstream slope of the dam appears to have been placed in accordance with this procedure, but there is no evidence that a stone wall was constructed on the downstream side of the embankment.

c. Operating Records

The inspection report dated October 19, 1971 by the NYS-DEC (see Appendix F3-30) noted the presence of trees on the downstream slope.

d. Post-Construction Changes

No records of post-construction changes pertinent to structural stability are available for this dam.

e. Seismic Stability

This dam is in Seismic Zone 2. According to the Recommended Guidelines (Reference 1), a seismic stability analysis is not required.

6.2 STABILITY ANALYSIS

A structural stability analysis is not required because there are no gravity structures to analyze at this dam.

SECTION 7

ASSESSMENT AND RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Visual inspection of Ilion Reservoir No. 2 Dam revealed the following deficiencies which affect the safety of the dam:

- 1) Trees growing on the downstream slope of the dam and in the zone immediately adjacent to the toe.
- 2) Seepage and erosion on the east bank of Ilion Gorge close to the perimeter of the reservoir which could result in breaching of the strip of natural ground between the reservoir and the gorge.
- 3) An upstream slope of about 1.2H:1V and a downstream slope of about 1.5H:1V, both of which are considerably steeper than those of similar dams designed in accordance with modern standards of practice and which may not have an acceptable factor of safety against failure.
- 4) A soft, wet area next to the downstream toe of the dam in the deepest section of the valley.
- 5) Erosion and sloughing of the bank of Ilion Gorge and the deterioration of the erosion protection there, caused by the discharge of water from the drainage ditch that is located along the south and west sides of the reservoir.
- 6) A spring house on natural ground about 40 feet downstream from the toe of the dam which might become a focus for piping through the foundation of the dam.
- 7) An animal burrow on the downstream slope of the dam.
- 8) Brush and small trees in the drainage ditch that is the discharge channel for the auxiliary spillway and which could hinder flow from the auxiliary spillway.
- 9) Brush growing on the upstream slope, which is not now a problem, but could become a problem if allowed to grow too large.

Hydrologic and hydraulic analysis indicates that the dam would not be overtopped by the PMF. Therefore, in accordance with Corps of Engineers' screening criteria for review of spillway adequacy, spillway capacity is considered "adequate".

b. Adequacy of Information

Available information together with that gathered during the visual inspection, while considered adequate for this Phase I inspection, is deficient in that the presence of brambles and tall weeds on the contact between the downstream slope and the right abutment, and also in the zone adjacent to the downstream toe of the dam in the deepest part of the valley, makes it impossible to inspect those areas adequately.

c. Need for Additional Investigations

The following investigations should be performed by a registered professional engineer qualified by training and experience in the design of dams:

- 1) Investigate the stability of the embankment section, with particular attention to the steepness of the slopes.
- 2) Investigate the seepage and erosion on the bank of Ilion Gorge adjacent to the reservoir at locations of about 60 and 250 feet from the left abutment of dam.
- 3) Investigate the cause of the soft, wet area next to the downstream toe in the deepest section of the valley.
- 4) Investigate the erosion and sloughing which have taken place on the east side of Ilion Gorge and the deterioration of the erosion protection there, caused by the discharge of water from the drainage ditch that is located along the south and west sides of the reservoir.
- 5) Investigate the spring house which is located 40 feet from the downstream toe of the dam to determine if there is any potential for the initiation of piping at the spring house.

d. Urgency

The investigations recommended above in Section 7.1c should be started within 6 months after receipt of this Phase I Report by the Owner.

Any remedial work deemed necessary as a result of these investigations should be completed within 18 months after receipt of this report by the Owner.

81 Measures recommended below in Section 7.2a should be completed within 12 months after receipt of this report by the Owner.

7.2 RECOMMENDED MEASURES

The following work should be performed by the Owner. Where engineering assistance is indicated, the Owner should engage a registered professional engineer qualified by training and experience in the design of dams. Assistance by such an engineer may also be useful for some of the other work.

a. Complete Within 12 Months

- 1) Institute a program to visually inspect - not just casually look at - the dam and its appurtenances at least once a month.
- 2) Clear brush and small trees from the drainage ditch that is the discharge channel for the auxiliary spillway. Continue to keep this ditch clear by cutting and cleanup at least annually.
- 3) Remove trees, brush, and their root systems from the slopes of the embankment and to a distance of 20 feet downstream from the toe in accordance with specifications and field observation of the work by an engineer. Fill resulting holes with properly selected, compacted fill. Continue to keep these same areas and the crest of the dam clear by cutting, mowing, and cleanup at least annually.
- 4) Backfill animal burrows on the slopes of the embankment with properly selected, compacted fill.
- 5) Prepare written routine operation and maintenance procedures for the dam and its appurtenances.
- 6) Institute a program of comprehensive technical inspection of the dam and its appurtenances by an engineer on a periodic basis of at least once every two years.
- 7) Develop an emergency action plan outlining action to be taken to minimize the downstream effects of an emergency, together with an effective warning system.

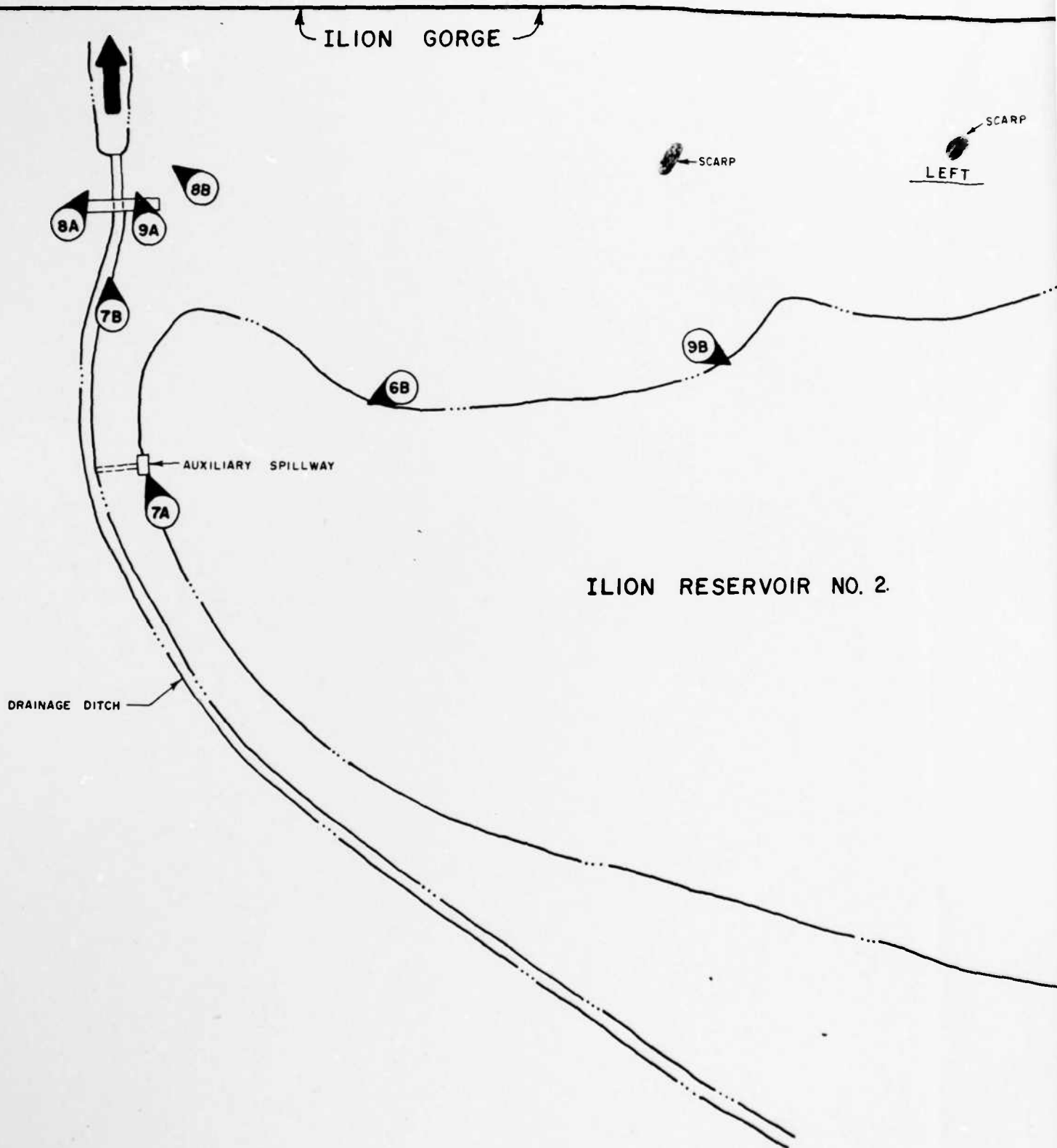
b. Complete Within 18 Months

3820 The following remedial work should be completed by the Owner. A qualified, registered professional engineer should design and observe the construction of the remedial work.

- 1) Appropriate modifications as a result of the stability investigation of the embankment.

- 2) Appropriate modifications as a result of investigating the seepage and erosion on the bank of Ilion Gorge adjacent to the reservoir.
- 3) Appropriate modifications as a result of investigating the cause of the soft, wet area next to the downstream toe.
- 4) Appropriate modifications as a result of investigating the erosion, sloughing, and deterioration of erosion protection on the side of Ilion Gorge where water discharges from the drainage ditch.
- 5) Appropriate modifications as a result of investigating the potential for piping at the spring house about 40 feet downstream of the toe.

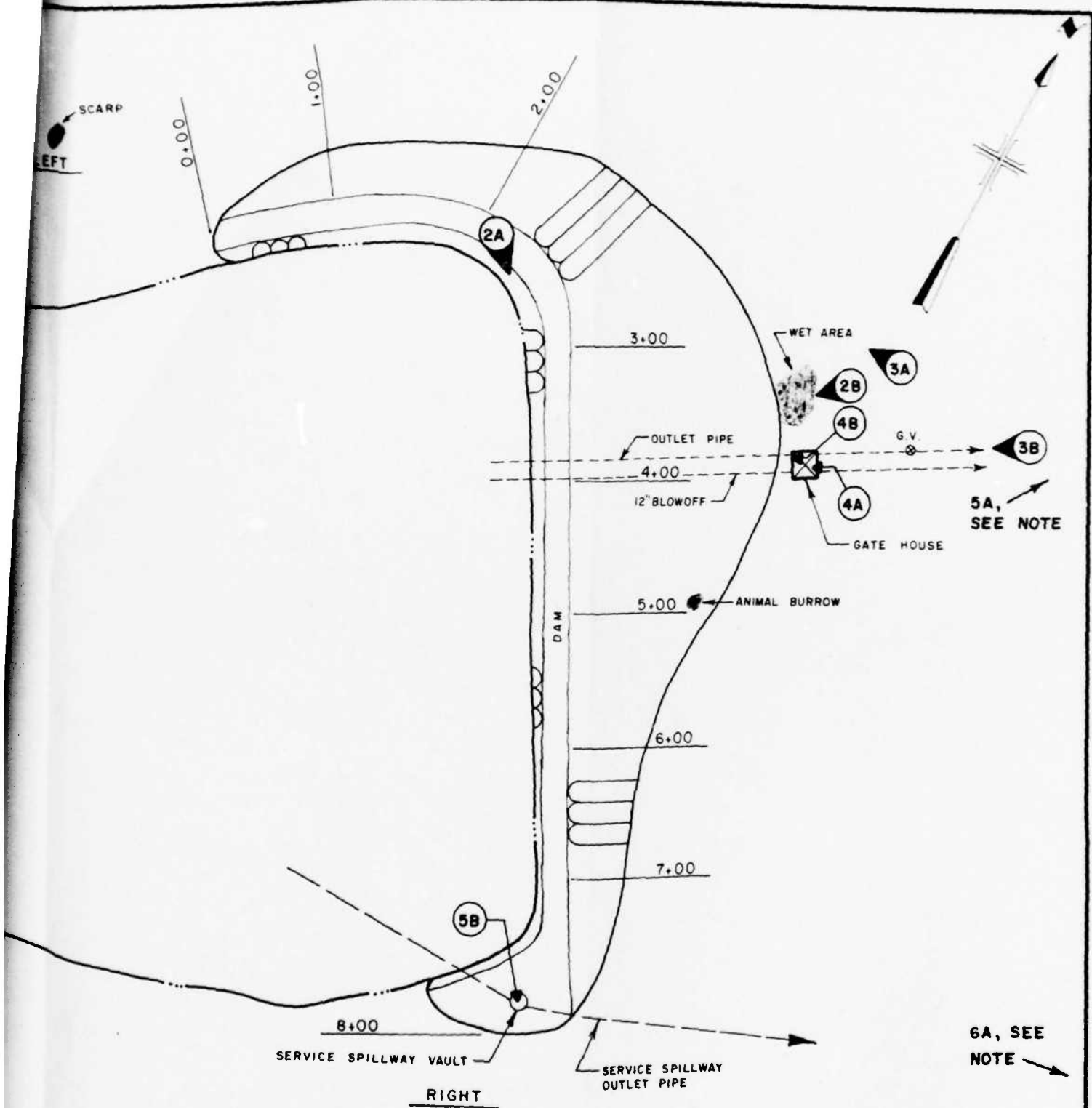
APPENDIX A
PHOTOGRAPHS



PHOTOS NOT LOCATED

PHOTO 5A IS AT D/S END OF BLOWOFF

PHOTO 6A IS AT D/S END OF SERVICE SPILLWAY OUTLET PIPE



ILION RESERVOIR NO. 2 DAM	
PHOTO INDEX MAP	
TOWN OF GERMAN FLATTS	HERKIMER CO., N.Y.
SCALE: NONE	DATE JULY 1981
 C. T. MALE ASSOCIATES, P. C. 1000 TROY ROAD, SCHENECTADY, N. Y. 12309 <small>PROFESSIONAL ENGINEERS LAND SURVEYORS LAND PLANNING CONSULTANTS</small>	

PROJECT NO. 58-01-00006/80.846

A-1

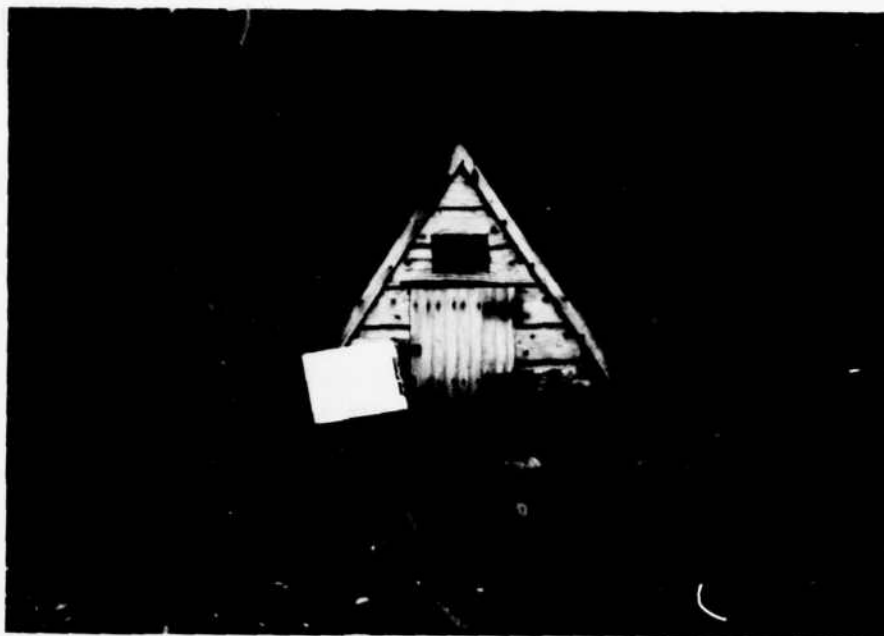
DWG. NO. 81-6



A-2A Top of dam viewed from about Sta 2+00 looking toward
right abutment - 6/4/81



A-2B Cleared area to left of gate house at downstream toe of dam
6/4/81



A-3A Spring house on natural ground about 40 feet from downstream toe and 22 feet lower than elevation of crest at about Sta 3+00
6/4/81



A-3B Gate house at downstream toe.
Note valve box for valve on outlet pipe downstream of gate house
6/4/81



A-4A View inside gate house. Removable handwheel and stem is on blowoff valve operating nut. In right of photo is operating nut and stem for upstream gate house valve on outlet pipe. Downstream gate house valve on outlet pipe is not shown - 6/4/81



A-4B Valve on blowoff, left side of photo, and upstream gate house valve on outlet pipe, right side of photo - 6/4/81



A-5A Culvert at downstream end of blowoff - 6/4/81



A-5B View inside service spillway vault. Outlet pipe from vault is at top of photo and wood stave upflow well is at bottom - 6/4/81



A-6A Downstream end of pipe from service spillway at ditch near Elizabethtown Road - 6/4/81



A-6B End of reservoir opposite dam. Note auxiliary spillway structure at center - 6/4/81



A-7A Overflow weir, right side of photo, and outlet culvert, left side of photo, of auxiliary spillway - 6/4/81



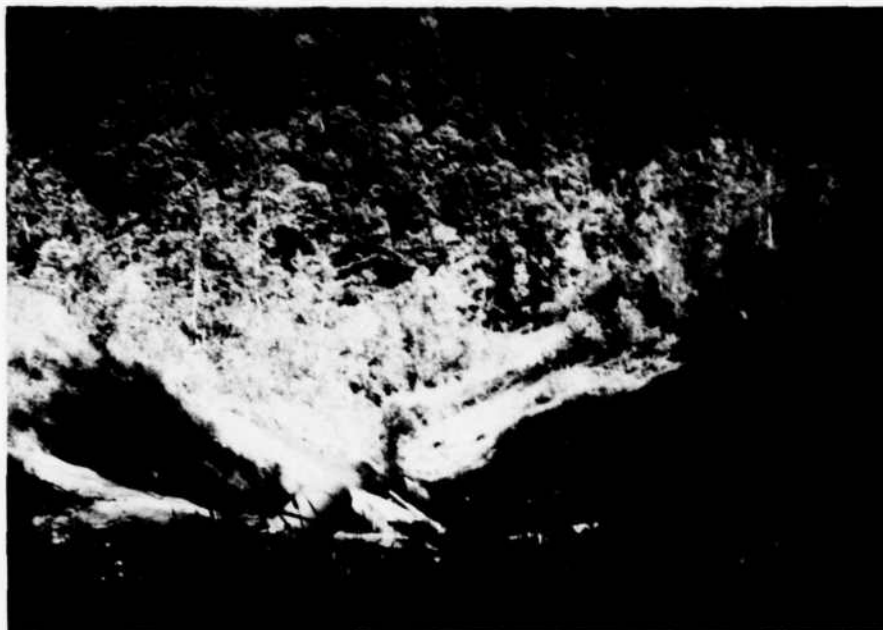
A-7B Ditch from downstream end of auxiliary spillway toward headwall at head of discharge channel at top of Ilion Gorge 6/4/81



A-8A Erosion and sloughing on right side of discharge channel, on east bank of Ilion Gorge where water from auxiliary spillway and reservoir perimeter drainage ditch discharges - 6/4/81



A-8B Erosion and displaced concrete matting on left side of discharge channel on east bank of Ilion Gorge - 6/4/81



A-9A Discharge channel for auxiliary spillway and reservoir perimeter drainage ditch, viewed from headwall down east side of Ilion Gorge - 6/4/81



A-9B Reservoir and dam viewed from area upstream of left abutment
6/4/81

APPENDIX B
VISUAL INSPECTION CHECKLIST

PHASE I

VISUAL INSPECTION CHECKLIST1. BASIC DATA

a. General

Name of Dam ILION RESERVOIR No. 2 DAMFed. I.D.# NY 00185 DEC Dam No. 690ARiver Basin MOHAWK (UPPER HUDSON)Location: Town GERMAN FLATTS County HERKIMERStream Name OFF STREAMTributary of UNNAMED TRIBUTARY OF STEELE CREEKLatitude (N) 42° 59.2' Longitude (W) 75° 3.9'Type of Dam EARTHHazard Classification HIGHDate(s) of Inspection JUNE 4, 1981Weather Conditions OVERCAST & COOL W/ LIGHT SHOWERS @ NOON!Reservoir Level at Time of Inspection AT SERVICE SPILLWAY
CREST, EL 116b. Inspection Personnel (*Recorder) THOMAS BENNEDUM - CTM,
EDWIN VOPELAK JR. * - CTM, RONALD C. HIRSCHFELD * - GEIc. Persons Contacted (Including Title, Address & Phone No.)
CHARLES R. BAKER, WATER SUPERINTENDANT HOME (315) 894-2348
OFFICE (315) 895-7711
EDWARD C. ALLSTON, ASST WATER SUPERINTENDANT (315) 895-7711
ADDRESS FOR BOTH - BOARD OF WATER COMMISSIONERS, MORGAN ST.,
P.O. BOX 330, ILION, NY 13357d. History
Date Constructed 1903 Date(s) Reconstructed N/A
Designer KNIGHT & HOPKINS (NO LONGER IN BUSINESS)
Constructed By MARSDEN CONSTRUCTION CO. (BUSINESS STATUS UNKNOWN)
Owner VILLAGE OF ILION BOARD OF WATER COMMISSIONERS,
MORGAN ST., P.O. BOX 330, ILION, NY 13357

1568

Name of Dam Ilion Reservoir No. 2 Dam Date June 4, 1981 22. EMBANKMENT

a. Characteristics

GEI 1) Embankment Material UnknownGEI 2) Cutoff Type UnknownGEI 3) Impervious Core UnknownGEI 4) Internal Drainage System UnknownGEI 5) Miscellaneous No comments

GEI b. Crest

GEI 1) Vertical Alignment GoodGEI 2) Horizontal Alignment GoodGEI 3) Lateral Movement No evidence of lateral
movement observedGEI 4) Surface Cracks None observedGEI 5) Miscellaneous No comments

GEI c. Upstream Slope

GEI 1) Slope (Estimate H:V) 1.2H:1VGEI 2) Undesirable Growth or Debris, Animal Burrows Some
low brush and unmowed weedsGEI 3) Sloughing, Subsidence or Depressions No evidence
of sloughing, subsidence, or depressions
observed

2786

Name of Dam Ilion Reservoir No. 2 Dam Date June 4, 1981

3

GEI 4) Slope Protection Riprap up to an elevation about
2 feet above reservoir levelGEI 5) Surface Cracks or Movement at Toe Not visible
beneath water surface

GEI d. Downstream Slope

GEI 1) Slope (Estimate - H:V) 1.5H:1VGEI 2) Undesirable Growth or Debris, Animal Burrows Slope
covered with large trees up to about 18 inches in diameter.
One animal burrow at Station 5+00 about 10 feet above
toe of slope.GEI 3) Sloughing, Subsidence or Depressions No evidence
of sloughing, subsidence, or depressions
observed.GEI 4) Surface Cracks or Movement at Toe None observedGEI 5) Seepage None observedGEI 6) External Drainage System (Ditches, Trenches, Blanket)
None observedGEI 7) Condition Around Outlet Structure Not applicableGEI 8) Seepage Beyond Toe Soft, wet area in deepest part
of valley around gatehouse between Stations
3+50 and 4+50.

GEI e. Abutments - Embankment Contact

GEI 1) Erosion at Contact None observed

GEI 2) Seepage Along Contact None observed

3. DRAINAGE SYSTEM

GEI a. Description of System None observed

GEI b. Condition of System Not applicable

GEI c. Discharge from Drainage System Not applicable

4. INSTRUMENTATION (Monumentation/Surveys, Observation Wells,
GEI Weirs, Piezometers, Etc.)

None observed

5. RESERVOIR

GEI a. Slopes Tree-covered slopes on south and west sides
of reservoir. No apparent stability problems with these
slopes. See 5.(c) below.

GEI b. Sedimentation No evidence of significant
sedimentation observed.

GEI c. Unusual Conditions Which Affect Dam
See Item 12 at end of checklist.

6. AREA DOWNSTREAM OF DAM

- a. Downstream Hazard (No. of Homes, Highways, etc.) 1 DWELLING
ABOUT 200' D/S OF DAM ON RIGHT, SEVERAL MORE ON RIGHT STARTING 500'
D/S, ALL DWELLINGS ARE ON ELIZABETHTOWN RD. WHICH ALSO COULD BE DAMAGED
- GEI b. Seepage, Growth Many trees growing downstream
of dam.
- GEI c. Evidence of Movement Beyond Toe of Dam None observed.
- d. Condition of Downstream Channel NO D/S CHANNEL

7. SPILLWAY(S) (Including Discharge Channel)

- a. General SERVICE SPILLWAY - 5' DIA. CONCRETE MANHOLE W/ 2' DIA
CAST IRON COVER. HAS INFLOW PIPE FROM RESERVOIR INTO 2' DIA
UPFLOW SECTION OF WOOD STAVE PIPE. OUTFLOW IS INTO 10" DIA CIP, AT FAIRLY
STEEP GRADE + LONG TO DITCH D/S OF DAM. AUXILIARY SPILLWAY - 4.5' CONCRETE
Ogee WEIR CREST TO 18" DIA CMP 15' LONG TO DITCH. SPILLWAY IS
AT RESERVOIR END OPPOSITE DAM. DITCH DISCHARGES TO 30" DIA PIPE
IN CONCRETE HEADWALL ABOVE STEEP, CONCRETE MATTED DITCH DOWN TO ILION GORGE.
- b. Condition of Service Spillway
2' DIA UPFLOW WOOD STAVE PIPE DETEIORATED, SPILLWAY
VAULT (MANHOLE) IS IN GOOD CONDITION. INFLOW PIPE NOT
OBSERVABLE. OUTFLOW PIPE (10" CIP) ONLY OBSERVABLE AT UIS
+ D/S END. UIS END RUSTED + OKAY, D/S END FREE
FROM OBSTRUCTION + DISCHARGES TO DITCH 250' D/S FROM DAM
- c. Condition of Auxiliary Spillway MINOR WEATHERING + STAINING
OF CONCRETE WEIR INLET. 18" CMP GOOD CONDITION BUT LAID LEVEL
TO DITCH. DITCH INCREASES IN CROSS FROM OUTLET END OF 18" CMP
TO 30" ASPHALT-COATED CMP IN HEADWALL D/S. DITCH CONTAINS SOME
ROCK RIPRAP + CONCRETE PAVING BOTH ROUGH + IN POOR
CONDITION. CHANNEL IS NARROW W/ ERODED AREA + TREE
+ BRUSH GROWTH. 30" CMP THROUGH HEADWALL REDUCES TO 18" CMP
WHICH DISCHARGES TO DISCHARGE CHANNEL DOWN TO ILION GORGE
HEADWALL + PIPES AT IT + D/S ARE IN GOOD CONDITION.

- d. Condition of Discharge Channel SERVICE SPILLWAY - 10" CIP DISCHARGES TO DRAINAGE DITCH 250' + D/S NEAR ELIZABETHTOWN ROAD. DITCH HAS BRUSH GROWTH BUT IS LARGE ENOUGH TO HANDLE SPILLWAY FLOWS
AUXILIARY SPILLWAY - 10" CMP D/S OF 30" CMP IN HEADWALL DISCHARGES TO STEEP CHANNEL DOWN TO ILION GORGE. PAVED W/ CONCRETE MATTING. CHANNEL HERE IS ERODED INTO HILLSIDE, SOME OF CONCRETE MATTING IS BROKEN UP, DISPLACED, & IN PLACES WASHED D/S

8. RESERVOIR DRAIN/OUTLET - OUTLET PIPE (RAW WATER SUPPLY MAIN FROM RES #1 TO RES #1)

- a. Type: Pipe ☒ Conduit _____ Other _____
- b. Material: Concrete _____ Metal ☒ Other _____
- c. Size: 10" CIP TO RES #1
12" CIP AT GATE HOUSE Length _____
- d. Invert Elevations: Entrance _____ Exit _____
- e. Physical Condition (Describe)
 Unobservable ☒
 1) Material _____
 2) Joints _____ Alignment _____
 3) Structural Integrity _____
 4) Hydraulic Capability GOOD
- f. Means of Control: Gate _____ THREE
Valves ☒ IN SERIES Uncontrolled _____
 Operation: Operable ☒ Inoperable _____ Other _____
 Present Condition (Describe) ALL VALVE OPERABLE TO SOME DEGREE
2 VALVES IN SERIES, NORMALLY OPEN, IN GATE HOUSE + ONE D/S OF GATE HOUSE
IN VALVE BOX. PIPE NORMALLY FULL OPEN IS REGULATED USING
VALVES D/S AT ILION RESERVOIR NO. 1.
- g. Other Outlets (water mains, diversion pipes) 12" CIP BLOWOFF
VALVE IN GATE HOUSE - HANDWHEEL OPERATED NORMALLY CLOSED,
DISCHARGES INTO LENGTH OF CULVERT (15" CMP) AT D/S
END. LEAKAGE WHEN VALVE IS CLOSED.

SEE H+H
 DATA
 CHECKLIST
 APPENDIX C

9. STRUCTURAL — NO STRUCTURAL CONCRETE SURFACES

- a. Concrete Surfaces NOT APPLICABLE
- b. Structural Cracking NOT APPLICABLE
- c. Movement - Horizontal & Vertical Alignment (Settlement) NOT APPLICABLE
- GEI d. Junctions with Abutments or Embankments Not applicable
- GEI e. Drains - Foundation, Joint, Face Not applicable
- f. Water Passages, Conduits, Sluices ONLY THE 2 SPILLWAYS,
10" OUTLET PIPE, + 12" BLOWOFF PIPE (SEE 7. & 8.)
- GEI g. Seepage or Leakage Not applicable

h. Joints - Construction, etc. NOT APPLICABLE

GEI i. Foundation Not applicable

GEI j. Abutments Not applicable

k. Control Gates NONE KNOWN.

l. Approach & Outlet Channels OUTLET PIPE DISCHARGES TO RES #1
BLOWOFF DISCHARGES TO DITCH DIS OF TOP. SERVICE SPILLWAY
DISCHARGES DIS OF DAM AT DITCH NEAR ELIZABETHTOWN ROAD
AUXILIARY SPILLWAY DISCHARGES TO DITCH DOWN HILL GORGE TO STEELE
CREEK - SERVICE SPILLWAY WELL FED BY PIPE FROM RESERVOIR

m. Energy Dissipators (Plunge Pool, etc.) NONE

n. Intake Structures NOT OBSERVABLE

o. Stability

p. Miscellaneous

10. APPURTENANT STRUCTURES (Power House, Lock, Gatehouse, Service Bridge, Other)

a. Description: _____

GATE HOUSE - CONCRETE STRUCTURE W/ WOOD FRAME, SLATE SHINGLE ROOFCONTAINS 2 VALVES ON OUTLET PIPE + ONEON BLOWOFFb. Condition: GATE HOUSE - MINOR SURFACE WEAR (SPALLING + CRACKING)
OF CONCRETE, DOOR + LOCK BROKEN.11. MISCELLANEOUS MECHANICAL/ELECTRICAL EQUIPMENTa. Description: N/A

b. Condition: _____

12. OTHER

For a distance of about 350 feet beyond the left end of the dam there is a high, steep (1.2H:1V) natural slope on the side of Ilion Gorge. The top of this slope is 50 to 90 feet from the edge of the reservoir. At about 60 feet from the left end of the dam there is active seepage from this slope at an elevation 25 feet lower than the top of the dam. Erosion at the seepage discharge has produced a vertical scarp about 5 feet high.

APPENDIX C

HYDROLOGIC AND HYDRAULIC ENGINEERING DATA
CHECKLIST AND COMPUTATIONSTABLE OF CONTENTS

	<u>Page</u>
Hydrologic and Hydraulic Engineering Data Checklist	C-1
Drainage Area Map	C-5
Elevation - Area - Storage Computations & Drainage Area	C-6
Drainage Area Data for HEC-1 DB Model	C-7
Discharge Computations	C-8
Overtopping Analysis	
Computer Input	C-10
Computer Output - Complete	C-11
Inflow and Outflow Hydrograph Plots	C-15

PHASE I INSPECTION
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA CHECKLIST

Name of Dam ILION RESERVOIR #2 DAM Fed. Id.# NY00185

1. AREA-CAPACITY DATA

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
a. Top of Dam	<u>920</u>	<u>14.5</u>	<u>251</u>
b. Design High Water (Max. Design Pool)	<u>UNKNOWN</u>		
c. Auxiliary Spillway Crest	<u>916.8</u>	<u>12.0 EST.</u>	<u>209 EST.</u>
d. Pool Level with Flashboards	<u>N/A</u>		
e. Service Spillway Crest	<u>916</u>	<u>11.4</u>	<u>199</u>

2. DISCHARGES

	<u>Volume</u> (cfs)
a. Average Daily (MAX DAILY FLOW \approx 1 MGD)	<u><1.5</u>
b. Spillway @ Top of Dam(1)	<u>20</u>
c. Spillway @ Design High Water	<u>UNKNOWN</u>
d. Service Spillway @ Auxiliary Spillway Crest Elevation	<u>2</u>
e. Low Level Outlet (BLOWOFF NORMALLY CLOSED, W/ W.S. @ SERVICE SPILLWAY CREST EST. Q = 25 cfs)	<u>0</u>
f. Total (of all facilities) @ Top of Dam	<u>20</u>
g. Maximum Known Flood	<u>UNKNOWN</u>
h. At Time of Inspection	<u><1.5</u>

(1) SERVICE SPILLWAY @ TOP OF DAM - 5 cfs
AUXILIARY SPILLWAY @ TOP OF DAM - 15 cfs.

3. TOP OF DAMElevation 920

- a. Type EARTH EMBANKMENT
- b. Width 20' Length 800'
- c. Spillover SERVICE SPILLWAY & AUXILIARY SPILLWAY
- d. Location SERVICE SPILLWAY - @ ABOUT RIGHT ABUTMENT OF DAM
AUXILIARY SPILLWAY - @ END OF RESERVOIR OPPOSITE FROM DAM

4. SPILLWAYSERVICEAUXILIARY

- a. 916 Elevation 916.8
- b. UPFLOW WELL W/ 10" DIA Type OGEE WEIR CREST 4.5' LONG DISCHARGING
CAST IRON OUTLET PIPE INTO 18" CMP CULVERT 15' LONG
- c. 10" DIA PIPE CONTROLS Width 18" DIA CMP CONTROLS OUTFLOW
OUTFLOW FOR DEPTS. OVER WEIR > 1.0 FEET
- d. ✓ Uncontrolled ✓
- Controlled:
- e. Type
(Flashboards; gate)
- f. Number
- g. Size/Length
- h. CAST IRON Invert Material CONCRETE WEIR CREST
- i. Anticipated Length
of Operating Service
- j. N/A Chute Length N/A
- k. N/A Height Between Spillway Crest 0.8'
& Approach Channel Invert
(Weir Flow)
- l. Other

4597

5. OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES

- a. Type: Gate _____ Sluice _____ Conduit ☒ Penstock _____
- b. Shape TWO CAST IRON PIPES - OUTLET PIPE + BLOWOFF
- c. Size OUTLET PIPE - 10" DIA (12" DIA AT U/S END THROUGH GATE HOUSE)
BLOW OFF - 12" DIA
- d. Elevations: Entrance Invert BOTH @ ~ 871 EST.
Exit Invert UNKNOWN
- e. Tailrace Channel: Elevation N/A

6. FLOOD WATER CONTROL SYSTEM

- a. Warning System NONE
- b. Method of Controlled Releases (mechanisms) VALVES AT D/S RESERVOIR
(ILLION RESERVOIR NO.1) ON OUTLET PIPE + ALSO OPERATING
VALVE ON BLOWOFF

7. CLIMATOLOGICAL GAGES

- a. Type NON-RECORDING RAIN GAGE
- b. Location AT FILTER PLANT (ABOUT 3000' NORTHEAST OF DAM)
- c. Period of Record FROM 1948 TO PRESENT
- d. Maximum Reading UNKNOWN Date _____

8. STREAM GAGES REFERENCE 23

- a. Type WATER-STAGE RECORDER * USGS GAGE # 01346000
- b. Location WEST CANADA CREEK AT EAST BRIDGE, NY
LAT. 43°04'08" LONG. 74°59'26" ~6 MILES NORTH OF DAM
- c. Period of Record CONTINUOUS FROM 1920 TO PRESENT, OTHERS FROM 1913
- d. Maximum Reading 23,500 cu = 41.9 cam Date MARCH 26, 1913

9. OTHER * HINCKLEY RESERVOIR LOCATED U/S

10. DRAINAGE BASIN CHARACTERISTICS

- a. Drainage Area 0.030 SQUARE MILES (19 ACRES)
- b. Land Use - Type WOODLAND W/ GRASS AROUND RESERVOIR
- c. Terrain - Relief FAIRLY FLAT
- d. Surface - Soil GLACIAL TILL (?)
- e. Runoff Potential (existing or planned extensive alterations to existing surface or subsurface conditions)

SMALL. MOST OF AREA WHICH WOULD NATURALLY
DRAIN INTO RESERVOIR IS INTERCEPTED BY DITCH
WHICH BYPASSES RESERVOIR & DISCHARGES INTO ILION GORGE

- f. Potential Sedimentation Problem Areas (natural or man-made; present or future)

NONE KNOWN.

- g. Potential Backwater Problem Areas for Levels at Maximum Storage Capacity (including surcharge storage)

GROUND AT END OF RESERVOIR OPPOSITE DAM (NEAR
AUXILIARY SPILLWAY) IS AT EL 918 OR ABOUT 2'
BELOW TOP OF DAM, EL 920

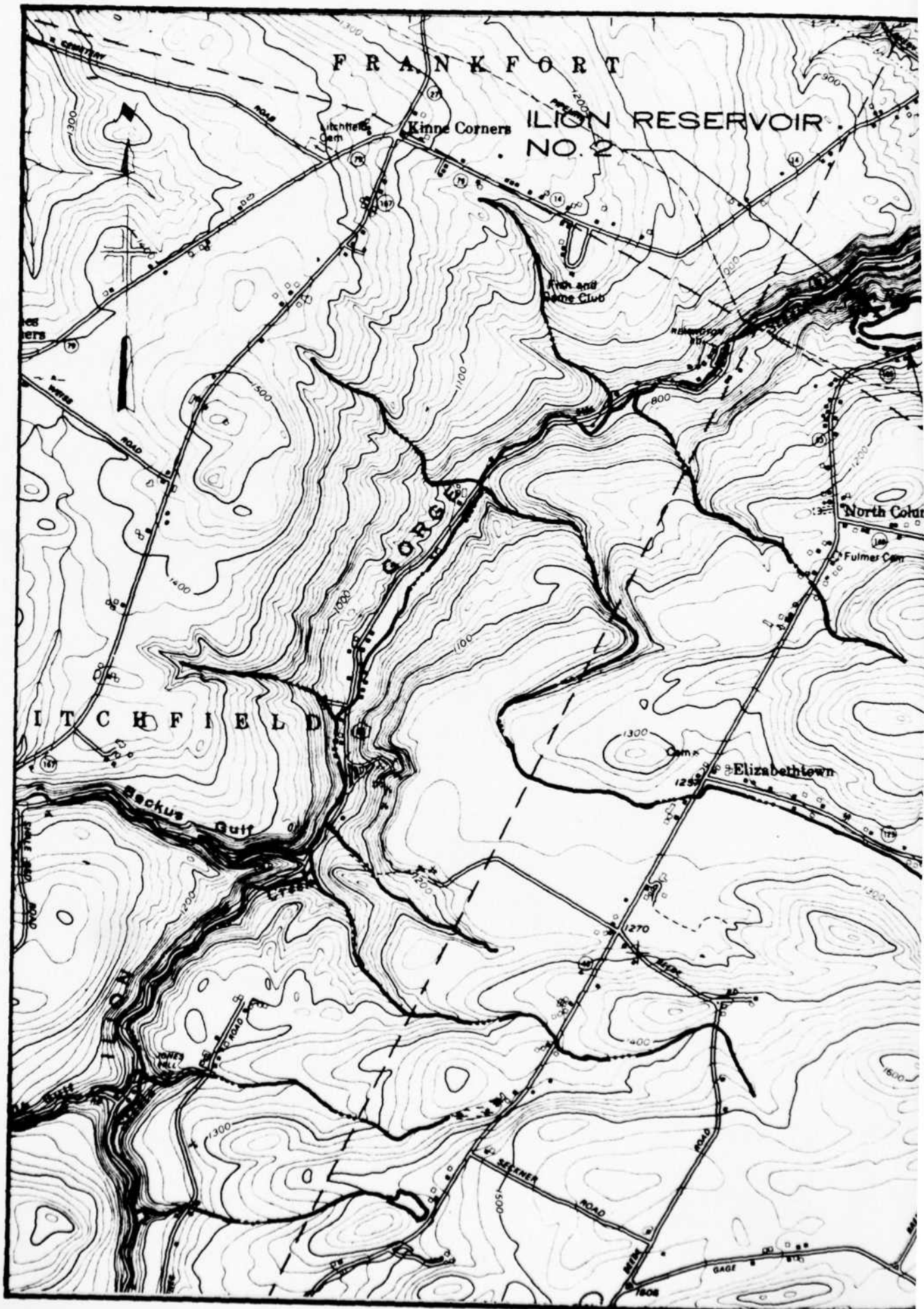
- h. Dikes - Floodwalls (overflow & non-overflow) - Low Reaches Along the Reservoir perimeter

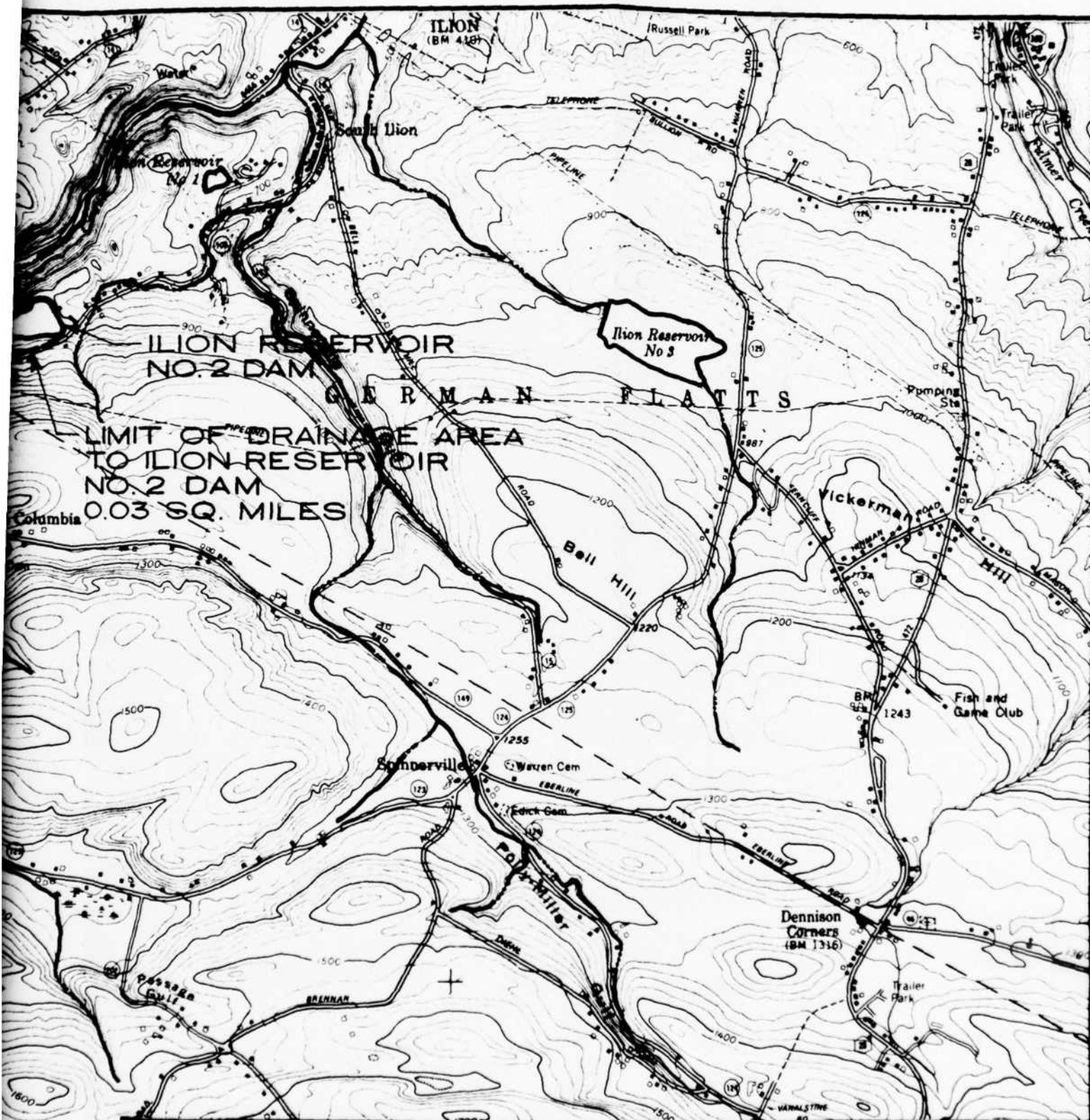
Location LOW AREA OF GROUND OPPOSITE DAM
ALSO AREA OF GROUND ALONG LEFT SHORE AT DAM HEIGHT
 Elevation LOW AREA - EL 918 +

- i. Reservoir

Length @ ^{SERVICE SPILLWAY CREST} ~~Maximum Design~~ Pool 1200' ± (feet)

Length of Shoreline (@ Service Spillway Crest) 3200' ± (feet)





APPROXIMATE SCALE IN FEET
0 2000 4000

DATUM - NGVD 1929
BASE MAP - 7.5' NYS DOT TOPO QUAD
20' CONTOUR INTERVAL
MILLERS MILLS, N.Y. - 1978

ILION RESERVOIR NO. 2 DAM DRAINAGE AREA MAP

TOWN OF GERMAN FLATTS HERKIMER CO., NY

SCALE: 1" = 2000'

DATE: JANUARY 1981



C. T. MALE ASSOCIATES, P.C.

3000 TROY ROAD, SCHENECTADY, N.Y. 12309

PROFESSIONAL ENGINEERS LAND SURVEYORS LAND PLANNING CONSULTANTS

PROJECT NO. 58.01.006/80.846

C-5

DWG. NO. 81-07

C. T. MALE ASSOCIATES, P. C.

ENGINEERS

SURVEYORS

ARCHITECTS

LANDSCAPE ARCHITECTS

PLANNERS

3000 TROY ROAD, SCHENECTADY, N. Y. 12309

(518) 785-0976

JOB ILION RESERVOIR #2 DAM

SHEET NO. _____ OF _____

CALCULATED BY CLV DATE 6/22/81

CHECKED BY MMB DATE 8/5/81

SCALE 80.00846

ELEVATION - AREA - STORAGE COMPUTATIONS

RESEVOIR VOLUME: COMPUTED BY METHOD OF CONIC SECTIONS

$$\Delta V_{12} = \frac{h}{3} (A_1 + A_2 + \sqrt{A_1 A_2})$$

	ELEVATION (5) (NGVD - ft.)	AREA (6) (acres)	INPUT VOLUME (acre-feet)
	871 (1)	—	0
SERVICE SPILLWAY CREST	916 (3)	11.4	199 (4) - 65 MILLION GALLONS
AUXILIARY SPILLWAY CREST	916.8	12.0 EST.	209 EST.
	918	13.0 EST.	225 EST.
TOP OF DAM	920 (2)	14.5	251
	940	18.4	579

(1) ESTIMATE BASED ON USABLE STORAGE DATA FROM OWNER (SEE APPENDIX F3-40)

(2) FROM PLAN OF SERVICE SPILLWAY DATED 1903 (SEE APPENDIX G-1)

(3) FROM DATA PROVIDED BY OWNER (SEE APPENDIX F3-40) & FIELD MEASUREMENT

(4) FROM DATA PROVIDED BY OWNER (SEE APPENDIX F3-35)

(5) RELATIVE ELEVATION DIFFERENCES BETWEEN BOTH SPILLWAY CRESTS, LOW POINT NEAR AUXILIARY SPILLWAY (EL 918), & TOP OF DAM MEASURED IN FIELD. ALL ELEVATIONS ASSUMED TO BE NGVD.

(6) FROM USGS TOPOGRAPHIC MAPPING APPENDIX C-5, EXCEPT AS NOTED.

DRAINAGE AREA

	AREA (acres)	AREA (square miles)
WATERSHED DIRECT TO + INCLUDING RESERVOIR SURFACE (SUBAREA)	19 *	0.030

* RESERVOIR AT NORMAL POOL HAS SURFACE AREA OF 11.4 ACRES

C. T. MALE ASSOCIATES, P. C.

ENGINEERS

SURVEYORS

ARCHITECTS

LANDSCAPE ARCHITECTS

PLANNERS

3000 TROY ROAD, SCHENECTADY, N. Y. 12309

(518) 785-0976

JOB LION RESERVOIR #2 DAM

SHEET NO _____

OF _____

CALCULATED BY ELV

DATE 6/23/81

CHECKED BY QMA

DATE 8/5/81

SCALE 80.00846

DRAINAGE AREA DATA FOR HEC-1 DB MODEL

SUBAREA- INCLUDES RESERVOIR SURFACE (11.4 ACRES AT NORMAL POOL), AS WELL AS THE SMALL LAND AREA OF THE DRAINAGE AREA, FOR A TOTAL DRAINAGE AREA OF 19.0 ACRES (0.030 SQUARE MILES)

LOSS RATES: NONE BECAUSE RAINFALL = RUNOFF FOR WATER SURFACE + FOR THIS DRAINAGE AREA WE WILL ASSUME ALL LAND SURFACES ACT AS RESERVOIR SURFACE.

UNIT HYDROGRAPH PARAMETERS: U.H. W/10 MIN. DURATION + 1" RAIN

$$\bar{Q} = \frac{A(1")}{T} = \left(\frac{19.0 \text{ acres}(1")}{10 \text{ MINUTES}} \right) \left(\frac{43,560 \text{ sq ft}}{1 \text{ acre}} \right) \left(\frac{1 \text{ FT}}{12 \text{ INCHES}} \right) \left(\frac{1 \text{ MINUTE}}{60 \text{ SECONDS}} \right)$$

$$\bar{Q} = 115 \text{ cfs (W/O LOSS RATE)}$$

ELV

6/23/81

JTB

8/5/81

80.00846

DISCHARGE COMPUTATIONSSERVICE SPILLWAY:

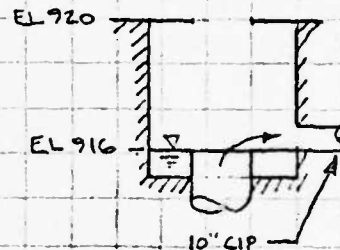
CONSISTS OF UPFLOW WELL W/ LONG
10" CIP OUTLET PIPE. PIPE AT STEEP GRADE

$$Q = .6A\sqrt{2gh}$$

$$A = \pi r^2 = .545 \text{ ft}^2$$

FORMULA FOR ORIFICE FLOW THROUGH
PIPE (INLET CONTROL), REF. 9
FOR FREE DISCHARGE

h = HEIGHT FROM C PIPE TO W.S.

SERVICE SPILLWAY
CROSS-SECTIONAUXILIARY SPILLWAY:

CONSISTS OF 4.5' OGEE WEIR CREST
4 18" DIA CMP OUTLET PIPE 15' ± LONG

IF WEIR CONTROLS: $Q = 3.33(LH^{1.5})$

(FROM REF. B)

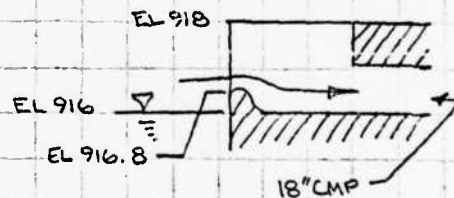
H = HEIGHT OVER WEIR, L = 4.5'

IF CULVERT CONTROLS: $Q = .6A\sqrt{2gh}$

FORMULA FOR ORIFICE FLOW THROUGH
PIPE (INLET CONTROL), REF. 9
FOR FREE DISCHARGE

h = HEIGHT FROM C PIPE TO W.S.

$$A = \pi r^2 = 1.767 \text{ ft}^2$$

AUXILIARY SPILLWAY
CROSS-SECTION

	ELEVATION (NGVD)	SERVICE SPILLWAY		AUXILIARY SPILLWAY				Q SPILLWAYS TOTAL
		h. (1) (ft)	Q (cfs)	H _{WEIR} (ft)	h _{PIPE} (1) (ft)	Q _{WEIR} (cfs)	Q _{PIPE} (cfs)	(cfs)
SERVICE SPILLWAY CREST	916	0	0	0	—	0	0	0
AUXILIARY SPILLWAY CREST	916.8	.4	2	0	—	0	0	2
	917	.6	2	.2	.25	1	—	3
	918	1.6	3	1.2	1.25	18	10	13
	919	2.6	4	2.2	2.25		13	17
TOP OF DAM	920	3.6	5	3.2	3.25		15	20
	921	4.6	6	4.2	4.25		18	24

(1) HEIGHT ABOVE C
OF PIPE.

C-8

C. T. MALE ASSOCIATES, P. C.

ENGINEERS

SURVEYORS

ARCHITECTS

LANDSCAPE ARCHITECTS

PLANNERS

3000 TROY ROAD, SCHENECTADY, N. Y. 12309

(518) 785-0976

JOB ILION RESERVOIR #2 DAM

SHEET NO. _____ OF _____

CALCULATED BY CLV

DATE 6/23/81

CHECKED BY JMB

DATE 8/5/81

SCALE 80.00846

DISCHARGE COMPUTATIONS

DAM APPURTENANCE

ELEVATION

SIZE

SERVICE SPILLWAY

INVERT EL 916

10" CIP

AUXILIARY SPILLWAY

CREST EL 916.8

4.5' WEIR TO 18" CMP

DAM

TOP OF DAM EL 920

800'± CREST LENGTH

OUTLET PIPE

INLET INVERT EL B71 EST.
(MAX. DRAFT = 1.0 MGD ± 1.5 cfs)

10" DIA CIP

BLOWOFF PIPE

INLET INVERT ≤ EL B71 EST.
(NORMALLY CLOSED)

12" DIA CIP

FOR FLOW OVER DAM: $Q = 3.087 L H^{1.5}$ (FORMULA FOR CRITICAL FLOW OVER BROAD-CRESTED WEIR, REF. 9)
INPUT

	ELEVATION (NGVD)	H _{SERVICE SPILLWAY} (ft.)	H _{AUXILIARY SPILLWAY} (ft.)	H _{DAM} (ft.)	Q _{OUTLET} (cfs)	Q _{BLOWOFF} (cfs)	Q _{SERVICE SPILLWAY} (cfs)	Q _{AUXILIARY SPILLWAY} (cfs)	INPUT Q _{TOTAL SPILLWAYS} (cfs)	Q _{DAM} (cfs)	Q _{TOTAL} (cfs)
SERVICE SPILLWAY CREST	916	0	0	0	0	0	0	0	0	0	0
AUXILIARY SPILLWAY CREST	916.8	.8	0	0	↓ ASSUMED CLOSED	↓ ASSUMED CLOSED	2	0	2	0	2
	917	1	.2	0			2	1	3	0	3
	918	2	1.2	0			3	10	13	0	13
	919	3	2.2	0			4	13	17	0	17
TOP OF DAM	920	4	3.2	0			5	15	20	0	20
	921	5	4.2	1	0	0	6	18	24	2470	2,494

FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

RUN DATE: 8/13/81
TIME: 2:19 PM

NYO DAM INSPECTION: DACW51-81-C-0014
NY00186 ILION RESERVOIR NO. 2 DAM, 80.00886
OVERTOPPING ANALYSIS IR201

JOB SPECIFICATION
NO NHR MNIN IOAY IHR IMIN METRC IPLT IPRT NSTAN
288 0 10 0 0 0 0 4 0
JOPEH NWT LGOPT TRACE
5 0 0 0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 2 LRTIO= 1

RTIO= 1.00 0.50

SUB-AREA RUNOFF COMPUTATION

SUBAREA RUNOFF COMPUTATION

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
SA 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

IHYDG IUNG TAREA SHAP TRSDA TRSPC RATIO ISNO4 ISAME LOCAL
1 -1 0.05 0.00 10.00 0.00 0.000 0 1 0

PRECIP DATA

SPFL PMS R6 R12 R24 R48 R72 R96
0.00 19.20 111.00 123.00 132.00 142.00 0.00 0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LHOPT STRKR ULTKR RTLOL ERAIN STRAS RTIOK STRIL GNSIL ALSMX RTIMP
0 0.00 0.00 1.00 0.00 0.00 1.00 0.00 0.00 0.00 0.00

RECESSION DATA

STRTO= -2.00 GRCSH= 0.00 RTIORE= 1.00

END-OF-PERIOD FLOW

MO.DA MP.MN PERIOD RAIN EXCS LOSS COMP 5 PG.DA HR.MN PLR100 RAIN EXCS LCSS COMP 0
0

SUM 21.81 21.81 0.00 2554.
(554.31 554.31 0.00 72.54)

HYDROGRAPH ROUTING

ROUTING FLOW THROUGH RESERVOIR

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO

ROUTING DATA																																															
STAGE	916.00	916.80	917.00	918.00	919.00	920.00	921.00																																								
FLOW	0.00	2.00	3.00	13.00	17.00	20.00	24.00																																								
CAPACITY=	3.	100.	251.	572.																																											
ELEVATION=	871.	916.	920.	940.																																											
<table border="1"> <thead> <tr> <th colspan="4"></th> <th colspan="4">DAM DATA</th> <th colspan="4"></th> </tr> <tr> <th>CREL</th> <th>SP-ID</th> <th>COOL</th> <th>EXPW</th> <th>ELEV</th> <th>COGL</th> <th>CAKEA</th> <th>EXPL</th> <th colspan="4"></th> </tr> </thead> <tbody> <tr> <td>916.00</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td colspan="4"></td> </tr> </tbody> </table>																DAM DATA								CREL	SP-ID	COOL	EXPW	ELEV	COGL	CAKEA	EXPL					916.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
				DAM DATA																																											
CREL	SP-ID	COOL	EXPW	ELEV	COGL	CAKEA	EXPL																																								
916.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0																																								
<table border="1"> <thead> <tr> <th colspan="4"></th> <th colspan="4">TOPEL</th> <th colspan="4">EXPD DAMWID</th> </tr> <tr> <th colspan="4"></th> <th colspan="4">CO-0</th> <th colspan="4">1.5</th> </tr> </thead> <tbody> <tr> <td colspan="4"></td> <td colspan="4">920.0</td> <td colspan="4">800.</td> </tr> </tbody> </table>																TOPEL				EXPD DAMWID								CO-0				1.5								920.0				800.			
				TOPEL				EXPD DAMWID																																							
				CO-0				1.5																																							
				920.0				800.																																							
PEAK OUTFLOW IS 14. AT TIME 42.17 HOURS																																															

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
				1.00	0.50

HYDROGRAPH AT	SA	0.03 (0.08)	1	335 (9.50)	166 (4.75)
---------------	----	------------------	---	-----------------	-----------------

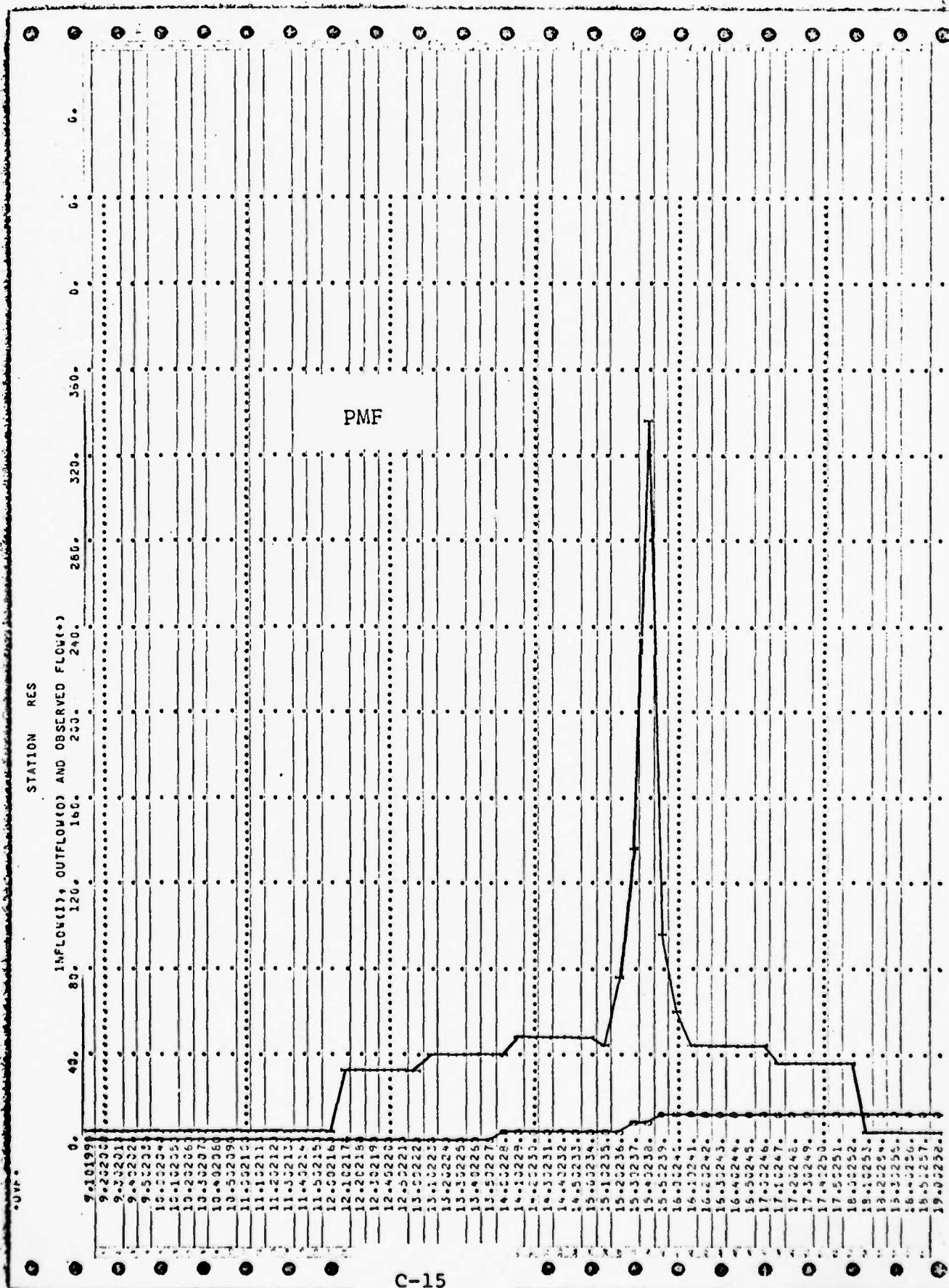
ROUTED TO	RLS	0.03 (0.08)	1	14 (0.39)	5 (0.13)
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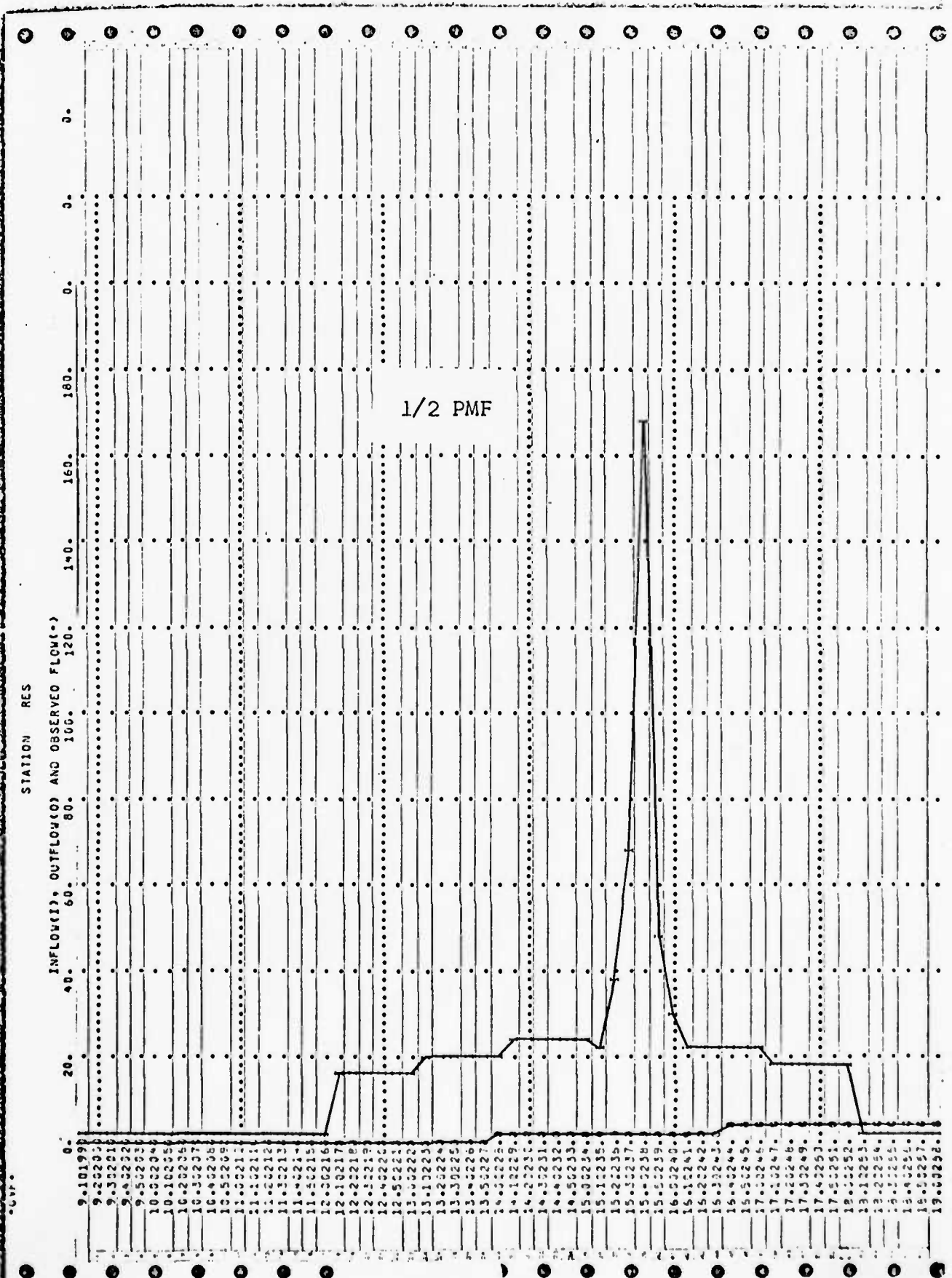
SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
STORAGE	916.00	916.00	920.00
OUTFLOW	199.	199.	251.
	0.	0.	20.

RATIO OF PME	MAXIMUM RESERVOIR W-S-ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FI	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF	
						MAX OUTFLOW HOURS	FAILURE HOURS
1.00	918.22	0.00	228.	14.	0.00	42.17	0.00
0.50	917.16	0.00	214.	5.	0.00	42.17	0.00





APPENDIX D

STABILITY ANALYSIS

NO GRAVITY STRUCTURES TO ANALYZE

APPENDIX E
REFERENCES

ILION RESERVOIR NO. 2 DAM, NY 00185

PHASE I INSPECTION REPORT

REFERENCES

This is a general list of references pertinent to dam safety investigations. Not all references listed have necessarily been used in this specific report.

1. "Engineering and Design, National Program For Inspection of Non-Federal Dams", ER 1110-2-106, Dept. of the Army, Office of the Chief of Engineers, 26 September 1979, with Change 1 of 24 March 1980. Included as Appendix D of the ER is "Recommended Guidelines For Safety Inspection of Dams".
2. "HEC-1 Flood Hydrograph Package, Users Manual", The Hydrologic Engineering Center, U.S. Army Corps of Engineers, January 1973.
3. "Flood Hydrograph Package (HEC-1), Users Manual for Dam Safety Investigations", The Hydrologic Engineering Center, U.S. Army Corps of Engineers, September 1978.
4. HMR 33, "Seasonal Variations of Probable Maximum Precipitation, East of the 105th Meridian for Areas 10 to 1000 Square Miles and Durations from 6 to 48 Hours," U.S. Dept. of Commerce, NOAA, National Weather Service, 1956.
5. HMR 51, "All-Season Probable Maximum Precipitation, U.S. East of 105th Meridian for Areas from 1000 to 20,000 Square Miles and Durations from 6 to 72 Hours", U.S. Dept. of Commerce, NOAA, National Weather Service, 1974.
6. HYDRO-35, "Five-to-60 Minute Precipitation Frequency for the Eastern and Central United States", U.S. Dept. of Commerce, NOAA, National Weather Service, June 1977.
7. "Technical Paper No. 40, Rainfall Frequency Atlas of the United States", U.S. Dept. of Commerce, Weather Bureau, 1961.
8. Design of Small Dams, United States Dept. of the Interior, Bureau of Reclamation, Second Edition, 1973, Revised Reprint, 1977.
9. King, Horace W. and Brater, Ernest F., Handbook of Hydraulics, fifth edition, McGraw-Hill Book Co., Inc., New York, N. Y., 1963.
10. "Flood Hydrograph Analyses and Computations", EM 1110-2-1405, U.S. Army Corps of Engineers, 31 August 1959.

11. "Technical Release No. 55, Urban Hydrology for Small Watersheds", U.S. Dept. of Agriculture, Soil Conservation Service (Engineering Division), January 1975.
12. National Engineering Handbook, Section 4, Hydrology, U. S. Dept. of Agriculture, Soil Conservation Service, August 1972.
13. "Hydraulic Design of Spillways", EM 1110-2-1603, U.S. Army Corps of Engineers, 31 March 1965, with Change 1 included.
14. "Standard Project Flood Determinations", EM 1110-2-1411, U.S. Army Corps of Engineers, 26 March 1952.
15. "Hydrologic and Hydraulic Assessment", Appendix D of EC 1110-2-188, U.S. Army Corps of Engineers, 30 December 1977.
16. "Reviews of Spillway Adequacy, National Program of Inspection of Non-Federal Dams", ETL 1110-2-234, U.S. Army Corps of Engineers, 10 May 1978.
17. Hammer, Mark J., Water and Waste-Water Technology, John Wiley & Sons, Inc., New York, 1975.
18. "Hydraulic Charts For the Selection of Highway Culverts", Hydraulic Engineering Circular No. 5, U.S. Department of Commerce, Bureau of Public Roads, December 1965.
19. "Guide for Making a Condition Survey of Concrete in Service", American Concrete Institute (ACI) Journal, Proceedings Vol. 65, No. 11, November 1968, pages 905-918.
20. "Upper Hudson & Mohawk River Basins, Hydrologic Flood Routing Models", New York District, Corps of Engineers, October 1976.
21. "Climatological Data, Annual Summary, New York, 1979", Volume 91, No. 13, National Oceanic and Atmospheric Administration, Asheville, North Carolina.
22. "Climatological Data, New York, September 1980", Volume 92, No. 9, National Oceanic and Atmospheric Administration, Asheville, North Carolina.
23. "Water Resources Data For New York, Water Year 1979", Volume 1, USGS Water-Data Report NY-79-1, U.S. Geological Survey, Albany, New York, 1980.
24. "Maximum Known Stages and Discharges of New York Streams Through 1973", Bulletin 72, U.S. Geological Survey, 1976.
25. "Characteristics of New York Lakes (Gazetteer)", Bulletin 68, U.S. Geological Survey and NYS Department of Environmental Conservation, 1970.

26. "Geologic Map of New York", Hudson-Mohawk Sheet, New York State Museum and Science Service, University of the State of N.Y., State Education Dept., Albany, N.Y., reprinted 1973.
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APPENDIX F

AVAILABLE ENGINEERING DATA AND RECORDS

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Location of Available Engineering Data and Records	F1
Checklist for General Engineering Data and Interview with Dam Owner	F2
Copies of Engineering Data and Records	F3

30
APPENDIX F

SECTION F1

LOCATION OF AVAILABLE ENGINEERING DATA AND RECORDS

1. Owner: Village of Ilion Board of Water Commissioners
P.O. Box 330
Morgan Street
Ilion, NY 13357
Attn: Charles R. Baker, Water Superintendent
(315) 895-7711

Available: Construction contract and
specifications, background
data, drawings.
2. Designer: Knight and Hopkins (no longer in business).
3. Construction Contractor: Marsden Construction Co., Utica, N.Y.
(business status unknown)
4. Agency: NYS Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
Attn: George Koch, P.E., Chief, Dam Safety Section
(518) 457-5557

Available: Inspection report.

PHASE I INSPECTION

CHECKLIST FOR GENERAL ENGINEERING DATA
& INTERVIEW WITH DAM OWNERName of Dam ILION RESERVOIR NO. 2 DAM Fed. Id.# NY 00185Date 1/29/81 6/4/81 Interviewer(s) EDWIN VOPELAK JR.
THOMAS BENNEDUM

Dam Owner/Representative(s) Interviewed, Title & Phone# _____

CHARLES R. BAKER, WATER SUPERINTENDANT (315) 895-7711EDWARD C. ALLSTON, ASS'T WATER SUPERINTENDANT (315) 895-7711

1. OWNERSHIP (name, title, address & phone #) VILLAGE OF ILION
BOARD OF WATER COMMISSIONERS, MORGAN ST., P.O. BOX 330,
ILION, NY 13357 (315) 895-7711

2. OPERATOR (name, title, address & phone # of person responsible
for day-to-day operation) CHARLES R. BAKER, WATER SUPERINTENDANT

OFFICE - (SAME ADDRESS & PHONE AS OWNER)HOME - 157 PROSPECT ST., ILION, NY 13357 (315) 894-2348

a. Operator Full/Part time SUPT FULL TIME, RESERVOIR OPERATED
BY WATER DEPT PERSONEL ON PART-TIME BASIS

3. PURPOSE OF DAM

a. Past CREATE IMPOUNDMENT FOR RAW WATER STORAGE

b. Present (SAME AS ABOVE)

4. DESIGN DATA

a. Designed When 1902-1903

b. By (name, address, phone #, business status) _____

KNIGHT & HOPKINS, ROME, NY(NO LONGER IN BUSINESS)

c. Geology Reports NONE KNOWN

d. Subsurface Investigations NONE KNOWN

e. Design Reports/Computations (H&H, stability, seepage)

NONE KNOWN

- f. Design Drawings (plans, sections, details) YES (SOME) - SEE APPENDICES G-1 TO G-3
- g. Design Specifications YES (INCLUDES CONTRACT) - SEE APPENDICES F3-1 TO F3-30
- h. Other HISTORY OF WATER SYSTEM (SEE APPENDICES F3-33 TO F3-38) AND GENERAL DATA ON DAM (SEE APPENDIX F3-39), BOTH FROM OWNER

5. CONSTRUCTION HISTORY

a. Initial Construction

- 1) Completed When 1903
- 2) By (name, address, phone #, business status) MARSDEN CONSTRUCTION CO., UTICA, NY
BUSINESS STATUS UNKNOWN
- 3) Borrow Sources/Material Tests NONE KNOWN.
- 4) Construction Reports/Photos NONE KNOWN.
- 5) Diversion Scheme/Construction Sequence NONE KNOWN.
- 6) Construction Problems NONE KNOWN
- 7) As-Built Drawings (plans, sections, details) NONE KNOWN.
- 8) Data on Electrical & Mechanical Equipment Affecting Safe Operation of Dam NONE KNOWN, NO ELECTRICAL EQUIPMENT AT DAM.
- 9) Other N/A

- b. Modifications (review design data & initial construction items as applicable & describe) _____

NONE KNOWN.

- c. Repairs & Maintenance (review design data & initial construction items as applicable & describe) _____

- EARLY 1950'S REPLACED 12" TILE DRAIN TO SPILLWAY WELL W/ 10" CIP & RELOCATED TO WEST SIDE OF ELIZABETHTOWN RD.
- 1963± PLACED 12" GATE VALVE ON OUTLET PIPE FROM RESERVOIR D/S OF GATE HOUSE
- MOW GRASS REGULARLY, CUT BRUSH OFF RIPRAP ANNUALLY, & SOME TREE THINNING & DEAD TREE REMOVAL AROUND RESERVOIR, EXCLUDING DAM

6. OPERATION RECORD

- a. Past Inspections (dates, by, authority, results) _____

NYS-DEL INSPECTION - OCT. 19, 1971 (SEE APPENDIX F3-30)

- b. Performance Observations (seepage, erosion, settlement, post-construction surveys, instrumentation & monitoring records) NONE

- c. Post-Construction Engineering Studies/Reports _____

1961, 1964 STUDY OF WATER SYSTEM BY STEARNS & WHEELER, BUT DID NOT INCLUDE STUDY OF DAM.

- d. Routine Rainfall, Reservoir Levels & Discharges WATER DEPT,
- PERSONNEL MEASURE W. L. DAILY BELOW WEIR IN SEVICE SHALWAY WELL. PUT ON DAILY REPORTS. PERIOD OF RECORD ABOUT 1948 TO PRESENT (MAY BE SOME EARLIER).
 - APRIL - NOV. 1 - RAINFALL AT ACS #1, NEAR WATER TREATMENT PLANT, MEASURED BY PLANT OPERATOR. RECORDS FROM 1948 TO PRESENT.

- e. Past Floods That Threatened Safety (when, cause, discharge, max. pool elevation, any damage) NONE.
NEVER SEEN AUXILIARY SPILLWAY WORK.
- f. Previous Failures (when, cause, describe) NONE
- g. Earthquake History (seismic activity in vicinity of dam)
NONE KNOWN.

7. VALIDITY OF DESIGN, CONSTRUCTION & OPERATION RECORDS (note any apparent inconsistencies)

DRAWING (APPENDIX G-1) SHOWS 12" TILE DISCHARGE
PIPE, WHILE FIELD MEASUREMENTS INDICATES PIPE IS 10" CIR, LOCATED
AT A HIGHER ELEVATION

8. OPERATION & MAINTENANCE PROCEDURES

- a. Operation Procedures in writing? NO Obtain copy or describe. (reservoir regulation plan, normal pool elevation and status of operating facilities, who operates & means of communication to controller, mode of operating facilities, i.e., manual, automatic, remote) ALL VALVES & LINES WORK.
SEE 9. OTHER.
- b. Maintenance Procedures in writing? NO Obtain copy or describe. MOW CREST REGULARLY, EVERY ± 2 WKS
• ANNUALLY CLEAN BRUSH OFF RIPRAP
• DURING ICE FORMING WEATHER, DRAW RESERVOIR DOWN
BY OPENING BLOWOFF &/OR PLUGGING INTAKES. DRAWDOWN ABOUT 1'
TO PREVENT RIPRAP DAMAGE, RESERVOIR REFILLED IN SPRING.
• MONTHLY OPEN BLOWOFF TO WASH SEDIMENT OUT OF
RESERVOIR, MAY RUN FOR DAYS, WATER SURFACE MAY
DROP 1' OR 2'.

- c. Emergency Action Plan & Warning System in Writing? NO
Obtain copy or describe. (actions to be taken to minimize the D/S effects of an emergency) _____

WOULD UTILIZE WATER DEPT. PERSONEL TO CONTACT
PEOPLE IN HAZARD AREA BY GOING DOOR TO DOOR.

9. OTHER — OPERATION + MAINTENANCE PROCEDURES B.O.

- FLOW INTO RESERVOIR IS FROM VARIOUS INTAKES + REACHES DAM VIA 2 INCOMING RAW WATER SUPPLY LINES (8" + 6")
 - 8" LINE NORMALLY OPEN TO RESERVOIR
 - 6" LINE NORMALLY CLOSED TO RESERVOIR + CAN BE BYPASSED AROUND RESERVOIR
 - NORMAL W.S. IS AT SERVICE SPILLWAY (FRONT OVERFLOW) OUTLET PIPE INVERT WHICH IS 0.8' LOWER THAN AUXILIARY SPILLWAY (BACK OVERFLOW) crest
 - DEPENDING ON W.S. - INFLOW TO RESERVOIR VARIES FROM 0 TO MAX.
 - BOTH SUPPLY LINES HAVE VALVES FOR CONTROL @ RESERVOIR & @ INTERMEDIATE POINT NEAR RESERVOIR. ALSO ALL INTAKES HAVE VALVES & BYPASSES BACK TO STREAM.
- • RESERVOIRS VALVES: EXERCISED ONCE/YR.
- 8" INTERMEDIATE VALVE EXERCISED 2-3 TIMES/YR.
 - 6" " " NOT EXERCISED REGULARLY.
 - VALVES @ INTAKES EXERCISED 3-4 TIMES/YR.

OUTLETS - 10" CIP OUTLET PIPE TO RES #1 (12" LINE THROUGH GATE HOUSE)
12" CIP BLOWOFF PARALLEL + ALSO THROUGH GATE HOUSE +
DISCHARGES TO CULVERT SECTION TO STREAM NEXT TO ELIZABETHTOWN RD.
(1.4MGD TOTAL WATER SYSTEM CONSUMPTION) PROBABLY 1MGD MAX DRAW
OFF HERE

OUTLETS - CONTROL

- OUTLET PIPE - 2 VALVES IN SERIES, NORMALLY OPEN IN GATE HOUSE.
PIPE, NORMALLY FULL OPEN, IS REGULATED USING VALVES D/S
NEAR ILION RESERVOIR NO. 1. ALSO VALVE IN VALVE BOX D/S OF GATE HOUSE.
- BLOWOFF - 1 VALVE ON LINE IN GATE HOUSE, HANDWHEEL
OPERATED, NORMALLY CLOSED.

APPENDIX F

SECTION F3

COPIES OF ENGINEERING DATA AND RECORDS

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Construction Contract and Specifications - June 9, 1903	F3-1
Inspection Report, by NYS-DEC - October 19, 1971	F3-30
History of Ilion Waterworks, by Charles R. Baker, Water Superintendent	F3-33
Data on Dam Sites from Owner	F3-39

CONTRACT.

THIS AGREEMENT, made and entered into this

9th day of June, A. D. 1993,

between the Village of Ilion, N. Y., by its Board of

Water Commissioners of the first part, and.....

John Marsden.....

contractor, of the second part.

CLONER

F3-1

SPECIFICATIONS.

The work herein contemplated is the construction of a diverting dam on Hawk's creek, the furnishing and laying of a cast iron pipe from it to the impounding reservoir, the construction of about a sixty-three million gallon storage reservoir, also the furnishing and laying of a cast iron pipe from it to the present storage reservoir, also the construction of two filter beds, including the furnishing of all necessary material and labor for their erection with their appurtenances of masonry, piping, valves, gate houses, embankment, grading and other features, and the completion of the same in accordance with these specifications and contract and the plans or the evident intention thereof.

In the completion of the work all sticks, stones, surplus material, and rubbish of every description shall be removed from the site of the work and grounds, leaving them in a neat and tidy condition.

All material, of whatever nature, to be used in this work, shall be entirely suitable for the place for which it is intended, and all work done in a workmanlike manner, and both shall, in every respect and at all times, be subject to the inspection and approval of the engineer.

When deemed necessary by the engineer or inspector, the contractor shall employ a night watchman to guard any open or exposed work.

The contractor shall be responsible for the proper care, maintenance and protection of all work until his entire contract is completed, and the work found in good condition, and accepted.

OWNER

The contractor shall take pains to preserve in their positions the stakes set by the engineer, until permission has been given to remove the same.

Excavations shall be made of such dimensions, and carried to such depths as the engineer shall direct, and all work done to lines and grades given by him.

The contractor shall properly support all trenches and excavations, by bracing or otherwise, to keep them vertical, and will be held responsible for any damage done in the prosecution of this work to individual or property, when such damage is due to negligence or unskillfulness on his part, or on the part of his servants or agents.

The refilling of any puddle trench shall be composed of well tempered material, of a quality acceptable to the engineer. All puddle material shall be tempered in boxes, or a pug mill, and put on in layers from four to six inches in thickness; each layer panned or otherwise worked to a uniform consistency and surface. All puddle surface, when exposed to the air, shall be kept wet until covered.

The cement used for this work shall be of well seasoned standard American Portland cement and satisfactory to the engineer. Sufficient quantities for testing shall be furnished the engineer whenever and from such barrels or packages as he may indicate. At least ninety per cent. of the cement shall be capable of passing through a sieve made of No. 40 wire (Stubb's gage) of 10,000 meshes to the square inch. The cement, mixed with water and made into thin cakes, shall show no tendency to checking or cracking in either air or when exposed to steam at 212 degrees

Fahrenheit for two hours or when placed in boiling water for twenty-two hours. Briquettes of neat cement shall show a tensile strength per square inch of not less than 450 pounds for any one briquette and an average tensile strength of not less than 500 pounds per square inch when exposed in air twenty-four hours and in water for six days. Briquettes made of one part of the cement with three parts of sand proposed to be used shall show a tensile strength of not less than 140 pounds when exposed in air twenty-four hours and in water six days. The tests shall be made by and under the direction of the engineer.

Cement shall be properly housed and protected from absorption or moisture. Cement which has become lumpy shall not be used. Abundant time shall be given the engineer to make such tests of the cement as he may wish prior to its use.

Sand shall be clean and sharp and of proper size of grain, and shall, when deemed necessary by the engineer or inspector, be properly screened or washed at the contractor's expense.

Both mortar and concrete shall be mixed in tight boxes of suitable size, and with clean water, and only as needed for immediate use, and any that has stood long enough to take an incipient set shall not be used, but promptly removed from the work.

In concrete masonry all material shall be subject to the approval of the engineer and shall be accurately measured in the proportion of one part of cement, three parts of sand and five parts of stone broken to a

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NATIONAL DAM INSPECTION PROGRAM. ILION RESERVOIR NUMBER 2 DAM (--ETC(U)

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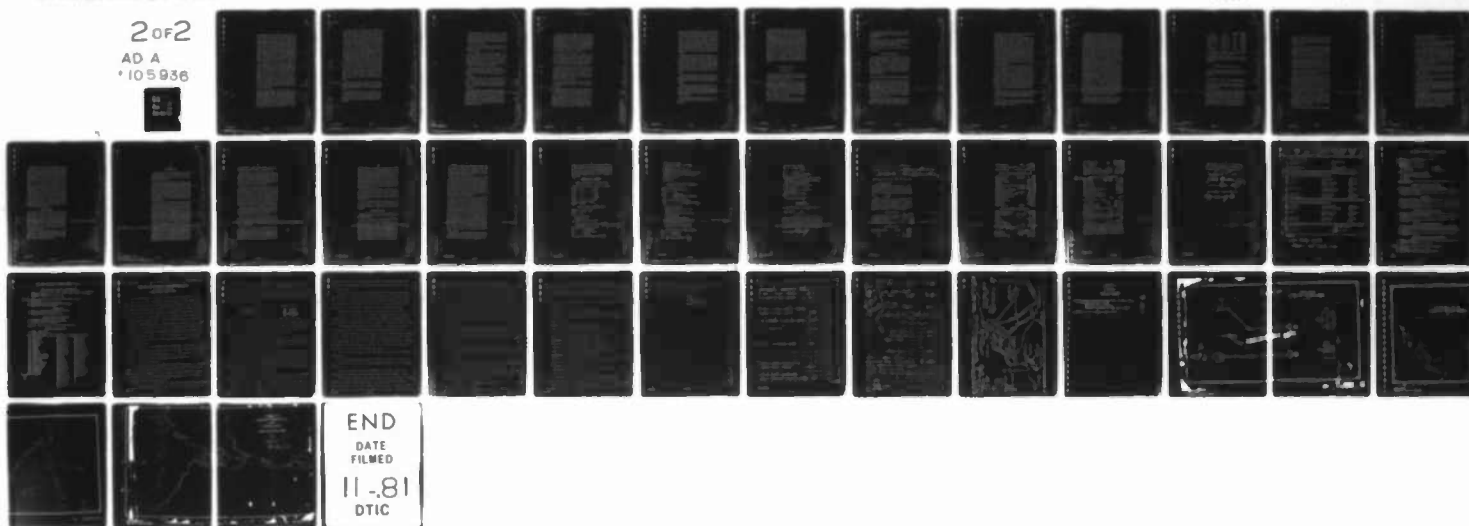
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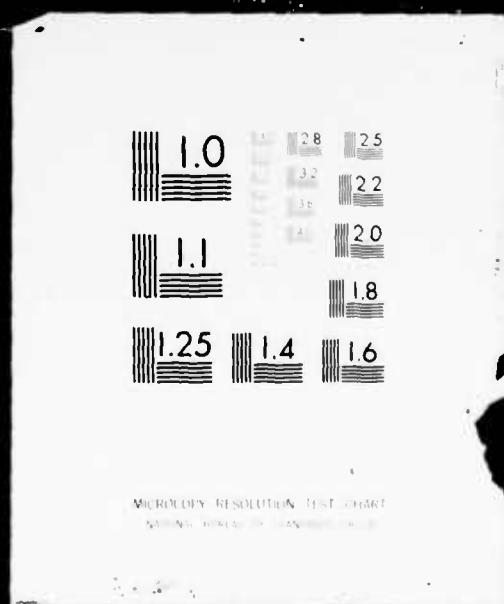


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size that will pass in any direction through a two inch ring. The stone shall be clean and free from dirt and dust, and wet just before mixing. The sand and cement shall be thoroughly mixed dry, using one barrel of cement to each batch, after which the water necessary shall be measured in, and the mass properly tempered, the stone then added, and the whole turned until properly mixed, and immediately deposited in place and rammed to grade. At the proper time, but within twenty-four hours, a grouting of pure cement shall be poured into all cavities formed in the laid cement, by the subsidence of the water or otherwise.

The surface to be covered shall be thoroughly wet before depositing the concrete, and the finished surface of the concrete shall be kept wet by sprinkling with water from time to time, as the engineer may require, for at least ten days, or until covered by other necessary construction. All concrete shall be mixed as near, in regard to both elevation and distance, to the position it is to occupy as is practicable, and it must, in any event, be deposited in place with such care that there shall be no separation of the stone from the mortar.

The concrete masonry walls of the intake dam, chamber and gate house; of the gate house and valve chamber, overflow chamber, sump and pipe piers of the impounding reservoir; of the side walls, piers, arches and entrance to the filter beds shall be built in forms of dressed lumber, formed so that the finished walls shall be true to line, and which shall be removed only after the masonry has sufficiently set. A mor-

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tar of equal parts of cement and sand shall be used next to the forms, one and-half inches in thickness, built up simultaneously with the placing of the concrete, and so placed as to form a smooth and continuous exterior and not displaced by the ramming of the concrete. This shall apply to the exterior surfaces of all the walls whether exposed to the action of water, air, or against the earth filling. The exposed top faces of any walls, such as the lip and copings at the intake dam, and copings and concrete covering stones at the reservoir and filter beds, shall be covered simultaneously with the placing of the concrete with a similar mortar one inch in thickness, well worked in and troweled smooth. The edges, angles and corners of this work shall be finished true and as shown on the large scale drawings. The water side of all walls, as well as the surface of the concrete in the bottom of the filter beds, shall be washed with a neat cement mortar laid on with a brush and made water tight. The concrete masonry classification covers the mortar surface whether put on with a trowel or brush.

The water tables of the gate house, door sills and lintels may be moulded in place, and the cornice blocks moulded and put in place when sufficiently hard.

No payment shall be made for any excavation upon this work, except when such excavations shall exceed six feet in depth. Such excavation shall in the following cases entitle the contractor to the following allowances.

Excavations below six feet in depth in the trench for the diverting dam, and in the puddle trenches under the main and side embankments of the reservoir, shall entitle the contractor to fifty cents per cubic yard for material so excavated.

All other material excavated, at the diverting dam, reservoir or filter beds, shall be paid for only as embankment in place.

In case of increase or decrease in the depth of excavation specified or shown on the profiles of pipe lines, except for bell holes, if ordered by the Board of Water Commissioners, or their engineer, additions or deductions shall be made to the contract lump sum in accordance with the following schedule:

In all cases the bottom of the pipes shall be laid to the depth specified for the trenches, and no allowance will be made for the additional depth required for the bell holes.

In trenches under six feet in depth, at the rate of thirty cents per cubic yard for the increase or decrease. In trenches between six and ten feet in depth at the rate of fifty cents per cubic yard for the increase or decrease.

In trenches below ten feet in depth, at the rate of one dollar per cubic yard for the increase or decrease. The computation of the increase or decrease in yardage shall be made upon the assumption of a trench one foot wider at the bottom than the inside diameter of the pipe, and with a batter of sides of trench of one inch per foot in depth.

Loose rock, shale and boulders will be classified as earth excavation, except boulders exceeding one half yard cubical contents and required to be removed will be classified as rock. Solid rock requiring blasting to remove will be paid for as rock and measured three feet wide in all trenches and from the surface of the rock as found to a depth of six inches below the required grade of the bottom of the pipes.

The refilling around foundations, masonry or pipe shall be paid for as embankment and measured two feet in thickness around such foundations, masonry or pipes; and such material, when refilled underneath or in the embankment, shall be thoroughly puddled.

In excavations, whenever deemed necessary by the engineer, the contractor shall, at his own expense, protect the bank from caving. No allowance will be made for handling material that has caved in beyond the line of required excavations, or for the proper refilling of the cavity so formed.

Borrow pits shall be left neatly sloped and graded in a uniform and tidy condition to the satisfaction of the engineer.

Embankment shall be made of material which shall be taken from necessary excavations and from the area included within the flow line of the reservoir, so far as such material is suitable, and where and of such quality and quantities, as the engineer may direct. If sufficient quantity of proper material cannot be obtained within the reservoir flow line, the remainder shall be taken from borrow pits to be indicated by the en-

gineer, and such borrow pits shall, at the completion of the work, be properly sloped and left in a neat and tidy condition which shall be satisfactory to the engineer. The inner half of the main embankment shall be composed of selected material, free from sods, sticks or other perishable material, and from which all stones, measuring over four inches, shall be removed, and such material shall not have to exceed twenty-five per cent. of small stones and gravel equally distributed.

All embankment material will be required spread in six inch layers, even and true, and solidified, to the satisfaction of the engineer or inspector, with a heavy grooved roller, weight not less than seven hundred pounds to the lineal foot. The material shall be wet from the under side by continuous sprinkling on the made embankment ahead of each layer, and then rolled.

The inner and outer slopes will be kept true to lines and grades, also the top, and all dressed uniformly for the reception of the slope walls, paving, sodding and seeding.

The detail prices given in the proposal for any portion of the work, shall apply upon the other portions for the same kind of work under similar conditions, where such detail prices are not required in specifications or proposal.

The quantity sheets will be divided so that a contractor may bid on one or all of the four sections of the work.

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The contractor on the dam, reservoir or filter beds will receive the pipe, specials, valves and valve boxes from the cars or boats, and haul, trench and lay or set all pipe, specials, valves and valve boxes within the embankment or masonry, also within the valve chambers, and extend the same as follows: The contractor on the diverting dam shall build the blow-off or drain pipe complete, and extend the affluent pipe to outside the masonry of the dam. The contractor on the reservoir shall lay the overflow pipe and drain complete, also the mud pipe complete, and extend the affluent pipe to a point outside the gate house masonry. The contractor on the filter beds shall lay all the pipes in connection therewith complete, and connect with the specials just outside the present gate house.

DIVERTING DAM.

HAWK'S CREEK.

The diverting dam with its intake and gate chambers and gate house is to be built of concrete as shown on the plans and herein described.

The gate house shall have a hip roof and its covering shall be an acceptable quality of slate underlaid with tarred paper and fastened with galvanized nails to matched and dressed pine roofing boards, supported by surfaced Carolina pine rafters, collar beams and wall plates, anchored to the masonry with three-quarter inch rods, eighteen inches long.

The first course of slate shall be doubled and project at least two inches beyond the line of the top

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The gate house walls, both outside and in, shall be troweled smooth and true, then roughened with a coarse brush.

The leaf rack slats are to be fastened securely to the timber with wire spikes, and the rack held in position with a cable chain attached to a post.

The tile drain from the valve chamber shall be laid as shown.

PIPE FURNISHING.

It is hereby specified that the work done under this head shall embrace the furnishing of all cast iron pipe contemplated for this work, including the furnishing of all special castings, delivered at Ilion, N. Y., together with all material, tools and labor necessary to complete the work in accordance with the plans and specifications, or their evident intentions.

CAST IRON PIPES AND SPECIAL CASTINGS.

At any time previous to delivery of pipes and specials these specifications will be subject to such changes and revisions as to size and amount, as the Board of Water Commissioners shall require, and without change in contract rate or amount of payment, except for increased or diminished quantities, the aggregate number of pieces not to be increased or diminished more than twenty per cent.

Letters and figures, each not less than two inches in length, one-eighth in relief, will be cast on the outside of each pipe, setting forth the maker's initials,

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and the year when cast; the weight of each piece shall be plainly marked with white lead paint.

All pipes and special castings contemplated by these specifications shall be first-class in metal and workmanship, and equal in perfection to the best work of this character in the country, in uniformity of thickness, smoothness of inner and outer surface, in uniformity of lead room, purity of iron, manner of melting and moulding, in tensile strength and evenness of grain, in perfection and durability of coating, in freedom from unequal contraction and in the avoidance of all plugging and filling, in mode and security of testing, in avoidance of defects and imperfections of every nature, and in compliance with any and all drawings furnished.

The coating of the pipes and specials shall be with the Dr. Angus Smith's patent coal tar varnish, distilled until the naphtha is entirely removed and the material deodorized. Five per cent. of linseed oil will be mixed with the coating material. The coating material must be maintained at a temperature of 300 degrees Fahrenheit throughout the operation of dipping. The pitch varnish must be kept in the proper condition to insure the best results by frequent additions of the coating materials and occasional emptying of the old materials and refilling with fresh ingredients.

Immediately before coating, the pipes and specials must be thoroughly clean and free from rust and enter the bath at a temperature of 300 degrees Fahrenheit.

After the pipes have been coated they must be subjected to a hammer test while under the test pressure of 300 pounds per square inch.

The said Board of Water Commissioners shall have the right to appoint such engineer and inspector under him, from time to time, as they may deem necessary, whose decisions and directions shall be respected and obeyed by the contractor, and it shall be their duty and prerogative to see that the forgoing conditions are strictly complied with; to reject any material, mould or core, which in their judgment or in the judgment of either of them, would cause imperfections in material or workmanship; to supervise the coating, testing and weighing of pipes and castings; to require at any time specimen rods for testing; to reject after casting any pipe or castings which he or they may deem below the required standard of perfection. Palpable defects and imperfections which may have been passed or overlooked by the inspector, shall be deemed of sufficient cause for rejecting any pipe or casting by the said Board of Water Commissioners or their engineer, at any time prior to the final settlement and completion of the contract. The iron must possess a minimum tensile strength of sixteen thousand pounds per square inch. All pipes shall be cast vertically, and shall be truly cylindrical, with inner and outer surfaces concentric, and shall be tested at the foundry by hydraulic pressure to three hundred pounds per square inch, without failures or leaks of any description. All tools and men required by the inspector in the discharge of his duties shall be furnished by the contractor without cost to the Village of Hion.

Subject to the discretion of the engineer or inspector as to immaterial variations in weight and general description, all straight pipes shall be as follows:

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Diameter.	Length.	Depth of Socket.	Weight Per Length.
12 in. Class A	12 ft. 4 in.	4 in.	960 lbs.
12 in. Class B	12 ft. 4 in.	4 in.	825 lbs.
10 in. Class A	12 ft. 4 in.	4 in.	766 lbs.
10 in. Class B	12 ft. 4 in.	4 in.	610 lbs.
8 in.	12 ft. 4 in.	4 in.	590 lbs.
6 in. Class A	12 ft. 4 in.	4 in.	370 lbs.
6 in. Class B	12 ft. 4 in.	4 in.	343 lbs.

No allowance or payment will be made for more than three per cent. excess of weight.

All special castings, whether ordinary or flange, shall conform strictly to the thicknesses shown on the drawings.

VALVES AND VALVE BOXES.

The valves and valve boxes will be furnished by the Board of Water Commissioners on board cars at Ilion, N. Y.

TRENCHING, LAYING AND BACKFILLING.

The contractor for pipe laying will take the pipe, special castings, valves and valve boxes from cars or boat at Ilion, N. Y.

Trenches for all pipe and tile lines shall be excavated and the pipes laid in accordance with the plans and profiles exhibited, and where not so shown they shall be five feet in depth to the bottom of the pipes.

All necessary and proper measures must always be taken by the contractor to insure public safety while the work is in progress, by shoring, watching, light.

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ing, etc., and until the cause of all danger appertaining to the work shall have been removed, and he will be held liable for all damages resulting from negligence in this regard.

In the excavating of rock; all blasts must be properly covered to guard against injury to surrounding objects, and the contractor will be held responsible for all damage to persons or property caused by carelessness or otherwise in the prosecution of this work.

All pipes, castings and valves will be at the contractor's risk, until laid, and permanently placed, and if it be found that any defective pipe, casting, valve or valve box has been laid, it must be removed and replaced by acceptable material without extra charge.

All joints shall be made of a good quality of jute, well compacted and soft lead firmly upset.

The twelve, ten and eight inch pipe joints shall have a depth of lead of two inches; and the six inch a depth of lead of one and five eighths inches. In all cases the lead shall reach at least one eighth of an inch back of the groove of the bell. All valves, plugs and special casting joints, and all joints in creek crossings shall be run as near full of lead as practicable. All joints shall be made at one pointing.

Pipes and other castings shall be carefully swept and cleaned, as they are laid, of any earth or rubbish which may have found place inside during or before the operation of laying. Every open end of a pipe shall be plugged, or otherwise securely closed before leaving the work for the night.

All defective pipes or other pipes, not laid, castings

or other iron work or rubbish shall be removed from the fields and roads promptly.

All fences necessarily disturbed in the prosecution of this work shall be promptly replaced and put in good condition acceptable to the engineer.

Each piece of pipe shall be so laid as to have a solid bearing, and all the material filled under, around and over the pipe for a depth of six inches shall be solidly rammed. The remainder of the backfilling shall be compacted with water if it can be conveniently arranged to do so, or solidified with hand rammers; if the latter method is followed there shall be at least one rammer to two shovelers.

The contractor will not be allowed to use a scraper for backfilling trenches except after special agreement with the engineer as to the manner and times and places of such use.

Where rock is found in the trenches it shall be excavated three feet wide and six inches below the bottom grade of the pipe.

If required, a suitable derrick must be used in the laying of all pipes and the contractor will be required to employ all modern methods and appliances best adapted for the purpose of prosecuting this work in a satisfactory manner.

Measurements of pipe laid, upon which the final estimate will be based, will include the number of running feet of valves and ordinary special castings laid with the pipe. Contractors will, therefore, observe that the ordinary specials and valves will be paid for at the prices bid and again as an equivalent length of straight pipe furnished and laid.

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The engineer shall, upon the completion of the piping make such a leakage test of said piping as he may deem best, and if the leakage as found by him exceeds the rate of four hundred gallons per mile of piping in twenty-four hours, under the head of water pressure from the reservoir and diverting dam, the contractor shall take all proper and necessary steps and means to reduce the said leakage to the said four hundred gallons. In case of an increase in the amount of leakage above that allowable on the entire piping, the contractor shall have the option of forfeiting to the said village of Ilion at the rate of forty dollars for each one hundred gallons increase up to the amount of fifteen hundred gallons per mile, or of reducing it by taking the above mentioned steps and means. Upon failure of the contractor to put said piping in a proper state of repairs within thirty days after notice of the result of said test, the Water Commissioners of Ilion may do so at the contractor's expense.

TILE LINES.

The pipes used shall be vitrified, salt glazed, bell and spigot pipe of the best quality; sound and well burned; free from flaws, cracks or imperfections of any nature; circular in bore, with outer and inner surfaces truly concentric, and of uniform standard thickness, and may be in either two or two and one-half feet lengths, and with sockets of the usual depth. The tile shall be laid to alignments and grade to be given by the engineer.

The tile lines around the filter beds are to be laid open jointed; those from the valve chambers at the intake dam and at the reservoir are to have their joints caulked with jute and cemented.

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RESERVOIR.

The entire spaces to be covered by water and the embankments shall have all perishable matter removed therefrom and burned or deposited where required by the engineer.

All excavations for foundations, for the laying of pipes or other necessary purposes connected with the construction of this reservoir, shall be made of such dimensions and carried to such depths as the engineer may deem necessary, and all earth or rock removed therefrom may be deposited in or on the slopes of the embankment at once, or subsequently, or for the filling or grading, as may be decided for the best interest of the work.

The slope walls of the mains and side embankments shall be twelve inches thick, one stone deep, laid dry and solidly bedded; it shall be composed of suitable field or quarry stone, laid to line and sufficiently hammered to produce a wall of good and even face. The wall shall be laid so as to require as little chinking and spalling as possible, and stones of ungainly shape shall be rejected or so hammered as to properly bed and join. These slope walls shall all be backed with nine inches of gravel or quarry chips, and the price of the backing must be included in the price bid for the wall which will be figured twelve inches thick.

Both delivery main and mud pipe shall be twelve inches in diameter and will be laid through the embankment true to line and grade, and each, at the point where it crosses the puddle trench and a point midway between the puddle trench and the inner toe, shall be fitted with cast iron discs of the form and di-

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mensions shown, which shall be leaded on to the outside of the pipe and the joints securely caulked.

The sub-floor of the gate house shall be of concrete, eight inches thick, and shall slope to the six-inch drain tile. The surface of the concrete floor shall be finished smooth with a plaster composed of equal parts of cement and clean, sharp sand, applied with a plastering trowel by a skilled workman.

The gate house foundations and walls shall be built of concrete in accordance with the plans for the same and as described, for a similar gate house on Hawk's creek. It will also have same kind of roof and door and in all features be the same, except that it will have a floor as shown on the plans, and the lump sum-price bid for it shall include everything above the level of the bottom of the water table, except the screen pot cover lift and the valve rod and hand wheels.

Flanged special castings, flanged valves and copper screens shall conform to the drawings furnished. The various lines of tile drains and cast iron pipe shall extend through the gate house wall as shown.

All valve rods shall be lengthened and fitted with sockets and nuts on their ends as shown on the drawing. The contractor shall furnish one valve wrench for use in the gate house to conform in all respects to drawings furnished.

The cast iron washers for valve rods, of form and dimensions shown, shall be counter-sunk into the gate house floor and secured with screws. The price bid for flanged specials per pound shall include all handling, labor of setting, bolts and nuts, rubber gaskets and any other accessories which may be necessary to

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set the same in their proper positions and in good working order. It is hereby specified that the cast iron pipes and flanged or ordinary specials in the gate house, shall not be included in the measurements of lineal feet of pipe laid, but shall be paid for at the price bid per pound as above stated. This ruling shall hold good to such points outside the gate house walls as the various lines of pipe running into and from the gate house shall connect with the above mentioned special castings.

The bolts, nuts and centering pins for the screen pot cover shall be of composition metal. All other bolts shall be machine bolts of proper sizes and lengths for their respective flanges, and all nuts shall be hexagonal.

The inlet, overflow, affluent and mud pipes are to be laid as shown on the plans; and the overflow masonry, sumpt and pipe supports are to be of concrete.

FILTER BEDS.

The filter beds shall conform to the general and detail plans therefor.

The filter beds will be two in number and will be sand filters; each will have a filtering surface of about 3750 square feet, the bottom of which shall be composed of six inches of concrete. The filter bed area shall be thoroughly drained before the placing of the concrete, to accomplish which a six inch tile shall be laid in a trench excavated on a line one foot outside of the back side of the filter bed side walls and to a depth of one foot below the level of the bottom of the filter bed. Around this drain will be placed clean

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The Board of Water Commissioners will make necessary changes inside of the present gate house and extend the lines to a point just outside the walls of the gate house foundations, to which the contractor on the new filter beds will connect.

The contractor shall, at his own expense, keep all the work in good repair for six months after the work is completed, and shall correct and repair promptly during that time, all failures and leaks, of whatever description; the work is to be delivered in all respects in good condition at the end of that time. Said work shall not be finally accepted until the expiration of said six months, nor shall the ten per cent. reserve be payable until such final acceptance.

And it is further agreed that the work shall be commenced and carried on at such points, and in such order of precedence, and at such times and seasons as may, from time to time, be directed by the engineer.

The rate of progress of this work shall be such that it will be plainly evident to the Board of Water Commissioners that the whole system will be completed by the time set in this contract, and should the contractor neglect, from any cause, to prosecute it with sufficient dispatch, or fail to give sufficient evidence to the Board of Water Commissioners of his ability to complete his contract by the date above referred to, the execution of it may be suspended as provided under the direction of the Board of Water Commissioners, and in charge of its engineer, at the contractor's expense.

Monthly payments of ninety per cent. (90 per cent.) of the amount of work estimated by the engineer to have been done will be made to the contractor on or

OWNER

before the tenth day of each month, for all work done during the preceding month. The final payment of the ten per cent. reserve shall be made within thirty days after the expiration of the six months from the time of the completion and acceptance of the work aforesaid.

QUANTITY SHEET.

PIPE FURNISHING—SECTION ONE.

410 feet, 12 inch, Class A, 960 lbs. per length.

3850 " 12 " " B, 825 " " "

360 " 10 " " A, 766 " " "

1450 " 10 " " B, 640 " " "

360 " 8 " " 590 " " "

3525 " 6 " " A, 370 " " "

2150 " 6 " " B, 343 " " "

5000 lbs. hub spigot specials.

9000 " flange, "

PIPE LAYING—SECTION TWO.

3850 feet, 12 inch, laying.

1450 " 10 " "

5675 " 6 " "

8 Specials to be set.

4 Valves to be set.

800 Cubic yards rock excavation.

DIVERTING DAM—SECTION THREE.

55 Cubic yards excavation, earth.

55 " " embankment.

60 " " concrete masonry.

33 " " paving.

50 feet 12 inch tile, furnishing and laying.

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- 1 Gate house, complete.
- Setting valves and specials, complete.
- 1 Screen pot cover lift.
- 1 Manhole frame, cover and wrench.
- 1 Copper cylinder screen, 12 in. diam. 18 in. long.
- 1 Copper screen 1 ft. $11\frac{3}{4}$ in. x 3 ft. $11\frac{3}{4}$ in.
- 1 Wrought iron rack.
- 1 Leaf rack.
- 1 Valve wrench.

RESERVOIR—SECTION THREE.

- 1 Grubbing and clearing.
- 47600 Cu. yds. main embankment.
- 3700 " side "
- 2300 " puddle *Wall*
- 2000 " slope main and side embankment.
- 57 " concrete masonry.
- 410 Lineal feet 12 inch pipe, laying.
- 600 " " 12 " tile, furnishing and laying.
- 40 " " 6 " " "
- 1 Gate house, complete.
- 1 Screen 1 ft. $11\frac{3}{4}$ in. x 3 ft. $11\frac{3}{4}$ in.
- 1 Screen pot cover lift.
- Setting valves and specials, complete.
- 2 12 in. hood racks.
- 4 Discs, furnishing and placing.
- 3 Floor washers, furnishing and placing.
- 50 Lbs. lengthening valve rods.
- 1 Valve rod wrench with hand wheel.
- 1 Manhole frame cover and wrench.

FILTER BEDS—SECTION FOUR.

- 4530 Cu. yds. embankment.
- 681 " sand in beds.
- 50 M Brick laid dry*


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- 45 Cu. yds. sand in valley.
 134 " gravel in beds.
 3 " " valleys.
 970 " concrete.
 155 " broken stone over drain.
 400 Lineal feet 6 inch sewer tile.
 28 Manhole frames and covers, wt. 312 lbs. each.
 2 Gang planks, including appliances for lifting.
 2 Sets doors, complete, in place.
 400 Lbs. w. l. supports for gang plank.
 26 Brass strainers.
 50 Feet lead pipe, one inch diameter.
 1 Seeding banks.
 360 Feet 10 inch pipe, laying.
 360 " 8 " " " "
 1 Setting specials. complete.

PROPOSAL.

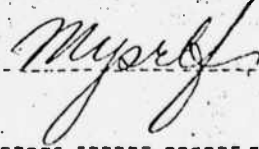
To the Board of Water Commissioners, Ilion, N. Y.

GENTLEMEN:—



 hereby agree to furnish all material and perform all the labor described in the specifications and in accordance with the plans, specifications and such detail drawings as may be furnished, and to execute the contract of which this proposal and the specifications are

a part, binding



OWNER

not to demand any extras of any kind whatever, ex-

cept as therein provided, for the sum of

Fifty nine thousand
\$54000.00 and *Six hundred dollars*

dollars on Section *1-2-3-4* and do bind

Myself
 to complete such work for the above sum, as in the contract provided, to the satisfaction of the engineer of your Board; such sum to be full payment, without extras of any kind, for the entire completion of the work.

And *S*
 hereby further propose that in case of any increase or diminution in the various quantities of work or material as given in the specifications the value of the same shall be allowed or deducted from the contract lump sum, according to the following schedule:

SECTION ONE.

6, 10 and 12 inch pipe, Class A, per ton

31.25

6, 8, 10 and 12 inch pipe, Class B, " "

31.25

Hub and spigot specials, " lb.

30

Flange specials (see drawings), " "

4 1/2

SECTION TWO.

Laying 12 inch pipe,

per foot

35

" 10 " "

"

30

" 8 " "

"

28

" 6 " "

"

25

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Setting specials,	each	1.00
" valves and valve boxes,	"	1.50
Rock excavation,	per cu. yd.	1.00

SECTION THREE—DIVERTING DAM.

Earth excavation,	per cu. yd.	40
Embankment,	" "	40
Concrete masonry,	" "	7.00
Paving,	" "	25.00
Furnishing and laying 12 in. tile, per foot		60
Gate house,	complete	300.00
Setting valves and specials,	"	10.00
Screen pot cover lift,	in place	5.00
Manhole frame, cover, and lift,	"	15.00
Copper cylinder screen,	"	25.00
Copper Screen	"	20.00
Wrought iron rack,	"	15.00
Leaf rack,	"	20.00
Valve wrench,	each	5.00

SECTION THREE—RESERVOIR.

Grubbing and cleaning,	\$	50.00
Main embankment,	per cu. yd.,	40
Side "	" "	40
Puddle,	" "	1.50
Slope wall,	" "	3.50
Concrete masonry,	" "	7.00
Laying 12 inch pipe,	" foot,	32
Furnishing & laying 12 in. tile,	" "	60
" " 6 " "	" "	25
Gate house,	complete	300.00
Copper screen,	in place,	20.00
Screen pot cover lift,	" "	5.00

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12 inch hook rack,	each,	25.00
12 " pipe d/c,	"	14.00
Floor washers	"	2.00
Lengthening valve rods,	per lb.,	1.10
Valve rod wrench with hand wheel, each,		10.00
Manhole frame, cover and wrench,	"	15.00

Brick laid dry SECTION FOUR—FILTER BEDS.

Embankment,	per cu. yd.,	10.00
Sand in beds,	" "	1.50
Sand in valley,	" "	1.50
Gravel in beds,	" "	2.00
Gravel in valley top of arches,	" "	2.00
Concrete masonry,	" "	7.00
Broken stone over drains,	" "	1.50
Furnishing and laying 6 inch sewer tile,	" foot,	28
Manhole frames and covers,		
in place,	each,	15.00
Gang plank, in place,	each,	20.00
Double doors, in place,	"	20.00
Wrought iron gang plank supports,	per lb.	1.10
Brass strainers,	each	.50
Lead pipe, 2 lbs. per foot,	per lb.	1.50
Furnishing seed and seeding banks complete		50.00
Laying 10 inch cast iron pipe,	per foot	1.80
" 8 " " " " " "		.28
Setting specials,	complete	10.00

The above lump sum and detail prices shall include all work, material and tools necessary, as described in the contract and specifications, and shown on the plans; and it is hereby understood and agreed that the above price for material and work of any kind

OWNER

whatever shall be accepted by the contractor as full compensation for such material or work in place in its proper position, and in good working order.

Dated June 9 1903.

John Marsden, Contractor.

P. O. Address Utica N. Y.

Names and addresses of proposed bondsmen:

Any Security Co.

OWNER

DAM INSPECTION REPORT

RESIDUAL

03	22			690A	101971	003	1
SS	CITY	YR AP.	DAM NO.		INS. DATE	USE	TYPE

AS PER INSPECTION

<input type="checkbox"/>	Location of Sp'way and outlet	<input type="checkbox"/>	Elevations
<input type="checkbox"/>	Size of Sp'way and Outlet	<input type="checkbox"/>	Geometry of Non-overflow section

1 GENERAL CONDITION OF NON-OVERFLOW SECTION

1	Settlement	1	Cracks	1	Deflections
1	Joints	0	Surface of Concrete	1	Leakage
1	Undermining	1	Settlement of Embankment	1	Crest of Dam
2	Downstream Slope	1	Upstream Slope	1	Toe of Slope

TREES

1 GENERAL COND. OF SP'WAY AND OUTLET WORKS

2	Auxiliary Spillway	4	Service or Concrete Sp'way	1	Stilling Basin
1	Joints	4	Surface of Concrete	1	Spillway Toe
2	Mechanical Equipment	1	Plunge Pool	1	Drain

1	Maintenance	B	Hazard Class
3	Evaluation	-4	Inspector

COMMENTS:

ILLION WATER WORKS

SHOWN ON COUNTY MAP

DEC

DEC DAM INSPECTION REPORT CODING

1. River Basin - Nos. 1-23 on Compilation Sheets
2. County - Nos. 1-62 Alphabetical
3. Year Approved -
4. Inspection Date - Month, Day, Year
5. Apparent use -
 1. Fish & Wildlife Management
 2. Recreation
 3. Water Supply
 4. Power
 5. Farm
 6. No Apparent Use
6. Type -
 1. Earth with Aux. Service Spillway
 2. Earth with Single Conc. Spillway
 3. Earth with Single non-conc. Spillway
 4. Concrete
 5. Other
7. As-Built Inspection - Built substantially according to approved plans and specifications

Location of Spillway and Outlet Works

1. Appears to meet originally approved plans and specifications.
2. Not built according to plans and specifications and location appears to be detrimental to structure.
3. Not built according to plans and specifications but location does not appear to be detrimental to structure.

Elevations

1. Generally in accordance to approved plans and specifications as determined from visual inspection and use of hand level.
2. Not built according to plans and specifications and elevation changes appear to be detrimental to structure.
3. Not built according to plans and specifications but elevation changes do not appear to be detrimental to structure.

Size of Spillway and Outlet Works

1. Appears to meet originally approved plans and specifications as determined by field measurements using tape measure.
2. Not built according to plans and specifications and changes appear detrimental to structure.
3. Not built according to plans and specifications but changes do not appear detrimental to structure.

Geometry of Non-overflow Structures

1. Generally in accordance to originally approved plans and specifications as determined from visual inspection and use of hand level and tape measure.
2. Not built according to plans and specifications and changes appear detrimental to structure.
3. Not built according to plans and specifications but changes do not appear detrimental to structure.

General Conditions of Non-Overflow Section

1. Adequate - No apparent repairs needed or minor repairs which can be covered by periodic maintenance.
2. Inadequate - Items in need of major repair.

(Items) For boxes listed on condition under non-overflow section.

1. Satisfactory.
2. Can be covered by periodic maintenance.
3. Unsatisfactory - Above and beyond normal maintenance.

DEC

DEC DAM INSPECTION REPORT CODING (cont.)

General Condition of Spillway and Outlet Works

1. Adequate - No apparent repairs needed or minor repairs which can be covered by periodic maintenance.
2. Inadequate - Items in need of major repair.

(Items) For boxes listed conditions listed under spillway and outlet works.

1. Satisfactory.
2. Can be covered by periodic maintenance.
3. Unsatisfactory - Above and beyond normal maintenance.
4. Dam does not contain this feature.

Maintenance

1. Evidence of periodic maintenance being performed.
2. No evidence of periodic maintenance.
3. No longer a dam or dam no longer in use.

(S.)

Hazard Classification Downstream

1. (A) Damage to agriculture and county roads.
2. (B) Damage to private and/or public property.
3. (C) Loss of life and/or property.

Evaluation - Based on Judgment and Classification in Box Nos.

Evaluation for Unsafe Dam

1. Unsafe - Repairable.
2. Unsafe - Not Repairable.
3. Insufficient evidence to declare unsafe.

River Basins	Counties	Counties
(1) LOWER HUDSON	1 Albany	56 Orange
(2) UPPER HUDSON	2 Albany	57 Orleans
(3) MOHAWK	3 Bronx	58 Oswego
(4) LAKE CHAMPLAIN	4 Broome	59 Otsego
(5) DELAWARE	5 Cattaraugus	60 Putnam
(6) SUSQUEHANNA	6 Cayuga	61 Queens
(7) CHEMUNG	7 Chautauque	62 Rensselaer
(8) OSWEGO	8 Chemung	63 Richmond
(9) GENESEE	9 Chenango	64 Rockland
(10) ALLEGHENY	10 Clinton	65 St. Lawrence
(11) LAKE ERIE	11 Columbia	66 Sullivan
(12) WESTERN LAKE ONTARIO	12 Cortland	67 Schenectady
(13) CENTRAL LAKE ONTARIO	13 Delaware	68 Schoharie
(14) EASTERN LAKE ONTARIO	14 Dutchess	69 Seneca
(15) SALMON RIVER	15 Erie	70 St. John
(16) BLACK RIVER	16 Essex	71 Sullivan
(17) WEST ST. LAWRENCE	17 Franklin	72 Tazewell
(18) EAST ST. LAWRENCE	18 Fulton	73 Tennessee
(19) RACQUETTE RIVER	19 Greene	74 Virginia
(20) ST. REGIS RIVER	20 Hamilton	75 Washington
(21) HOUSATONIC	21 Herkimer	76 Wayne
(22) LONG ISLAND	22 Jefferson	77 Westchester
(23) OSEWATCHEE	23 Lewis	78 Wyoming
(24) GLASSE	24 Madison	79 York
	25 Montgomery	
	26 Nassau	
	27 New York	
	28 Rensselaer	
	29 Saratoga	
	30 Schoharie	
	31 Seneca	
	32 St. Lawrence	
	33 Sullivan	
	34 Tazewell	
	35 Tennessee	
	36 Virginia	
	37 Washington	
	38 Wayne	
	39 Westchester	
	40 Wyoming	
	41 York	

PIC

Board of Water Commissioners

MUNICIPAL BUILDING
ILION, NEW YORK 13357

The first Board of Water Commissioners of the Village of Ilion, was elected at a special election, held February 21, 1891, called for this purpose by trustees of the Village, in compliance with a petition signed by a majority of the taxpayers. After their election, these men were assigned the tremendous task of determining the source of supply, the kind of works to be constructed and deciding upon its location and superintending its construction. Their operating capital was \$1,000.

It was first thought that a pumping system from deep wells, would be the most practical, but after several experiments with wells in the community, it was demonstrated that the quantity of water that these wells would furnish would be so small in comparison to the quantity required and the total number of wells would be so great, as to make it extremely impractical.

The Water Board then turned their attention to the flowing springs in various locations outside the Village. The yield from these springs proved to exceed the maximum quantity, as set. The locations of these sources, or springs, were so geographically wide spread, that again their use was extremely impractical.

At the September 4, 1891 special Water Board meeting, the following motion was made: "The secretary was instructed to write to the Stanwix Engineering Co., of Rome, N. Y., in regard to having their Mr. Knight come and look over the surrounding country and advise us in regard to the possible sources of water supply".

At the October 15, 1891 meeting, the written report from Mr. Knight was presented to the Water Board. This report was the beginning of the
OWNER

Village of Ilion's Public Water Supply. The report called for a gravity system. The supply, was an intake on a stream being brought to an impounding reservoir of about 15 million gallons. Water from this reservoir to pass thru two (2) open flow sand filters of 300,000 gallons each, per day. The filtered water to go to a covered distributing basin (clear well) of 900,000 gallon capacity.

The engineering cost estimates for the original system are;

Supply System	\$	32,960.
Filtering System	\$	16,000.
Distribution System (piping)	\$	44,300.
Total	\$	93,260.

At a special meeting of the Water Board, held March 20, 1892, bids for the above mentioned projects, were opened. There were three bidders, with a high of \$99,470. to a low of \$72,326.97; This low bid was disqualified and the next low bid of \$76,851.67 was accepted. The successful bidder was a Mr. J. J. Ramsey of Fostoria, Ohio

In 1893, the first reservoir of 15 million gallon capacity, being fed thru an intake from a spring fed stream, was constructed. The chosen point for the reservoir was a gully on a ridge of land, about two miles south of the Village, with an elevation of 732 feet.

About 800 feet to the north of said reservoir, at an elevation of 876 feet, two (2) slow sand filters with an area of 3,040 square feet each, were constructed. Our records indicate that these slow sand filters were the third to be constructed in the United States, with Poughkeepsie, N. Y. and Hudson, N. Y. being first and second. The filters in Ilion are still in operation and are being used everyday,

The effluent from these slow sand filters was piped to a below ground clear water basin. This clearwell is 103 feet in diameter, 14 feet deep, with a ground cover of 1 1/2 feet on a reinforced concrete dome. The side walls and support columns are of poured, reinforced concrete. The capacity of this basin is 900,000 gallons and the elevation of this clear-

OWNER

well-full-is 667 feet. This point, having an elevation of about 265 feet above our Main St., assured ample pressure by gravity, to every street in town.

The filtered water left the clearwell by a 16 inch transmission main to the newly constructed distribution system, on which customers were lined up to sign for taps to their property. Unfortunately, the sewer board had not been able to keep pace, so many applicants had to be denied the water service until the sewer had been installed.

This was the beginning of the Village of Ilion water works.

I would be very remiss as a proud department head, if I did not continue this article to the present time. Without too many details, I shall try, in chronological order, to update our system to the present.

As the population increased and industries expanded, it became necessary to increase the storage and filtration capacity to meet the demand. In 1902 - 1903, a new impounding reservoir (65 million gallons), fed by a second stream intake, was built. At the same time, two covered slow sands with 3,948 square feet each, were constructed. These filters more than doubled the original capacity. The control valves on these filters were located in the original gate house.

1913, saw the installation of a venturi meter on the distribution supply main.

In 1915, an additional intake on another stream was constructed and a transmission main laid to supply additional water to the reservoir of 1903.

In the year 1916, the use of chlorine in the water system was instituted. According to records, this process caused quite a storm.

1917 saw the addition of two more covered slow sand filters. These filters were 5,550 square feet each. The area of these two filters almost doubled the area of the existing four filters. The total filter area at this time, was about six tenths (.6) of an acre. In recent years,

OWNER

one of these larger filters has been taken out of service, due to structural failure. The present area being used is about .45% of an acre.

In 1922, work was commenced on a new reservoir, with associated piping, to the east and south of the Village, in a natural ravine. This project was completed in 1923 with an impounding capacity of 165 million gallons. The total impounding capacity was now 245 million gallons.

The Ilion Water Department, in 1938 joined with The Federal Works Progress Administration program, in the construction of a water softener plant. The W. P. A. was to construct the building at their cost and the Water Board, supply the softening units. These units being three in number-Permutit Manufacturer, using zeolite resin. This plant put in service June 3, 1939.

In 1947, a new building, designated as a chlorine house, was built to house additional chlorinators for the purpose of pre-chlorination.

A complete survey and study of all Water Department facilities was made by the consulting firm of Stearns & Wheeler and Pitometer Associates in 1960.

This survey led into a project of intensive renovation of and addition to, our existing treatment plant. This project lists as follows:

1. Replacing the softeners with high exchange resins and associated piping.
2. Constructing a building to house a Glenfield & Kennedy Micro-Strainer, 7feet 6", dia. and associated piping and laboratory.
3. Installing three (3) "diatomaceous earth filter units", complete with accessory equipment. These filter units are capable of producing 1 million gallons per day and are used to augment the production of our slow sand filters.
4. Complete new chlorine distribution system.

These projects completed in 1962.

In 1968, the Water Board decided it was time to eliminate the

antiquated flat rate billing system. It was decided to do this. The Village of Ilion would have to be metered 100%. The metering contract was awarded, with the Hersey Meter Co. being the successful bidder for meters and 100% remote readers. This project was successfully completed in 1969.

In the fall of 1970, contracts were bid on four (4) major projects. These are so listed:

Contract 1. - Steele's Creek Pumping Station

This involved (4) diverting intake dams bringing water to the pump station and pumping (if needed) into an existing reservoir. Completed in 1971

Contract 2. - Construction of Water Mains

This project was to strengthen our distribution system. The contractor installed 22,345 feet of 6 inch to 16 inch size, water pipe tied into the existing system. Completed in 1971

Contract 3. - Prestressed Concrete Water Tanks

Two concrete tanks were constructed on opposite ends of the distribution system. One tank has 2 million gallon capacity; the other a 0.5 million gallon capacity. Completed in 1971

Contract 4. - Old Forge Road Pumping Station

This was a booster station to push water into the 0.5 million gallon tank. The telemetering equipment was included in this contract. Completed in 1971

With these projects, our water system construction comes to rest until such time as we foresee a growing need.

I would like to say that the financing for the entire system, start to present, has come entirely from Water Department revenues.

Needless to say, the Board of Water Commissioners, its Superintendent and employees, are all proud of our water system. We adhere to the open

CLOVER

door policy - if ever in Ilion, N. Y. or vicinity, please stop and look us over. It is a fine way to spend a day.

On behalf of my Board, I say,

Thank you,

CHARLES R. BAKER

WATER SUPERINTENDENT

OWNER

F3-38

WATERSHED DRAINAGE AREA.

#1 RES. HAWK'S CREEK SQ. M.

No. 2 INTAKE TO No. 1 INTAKE 0.48

#2 RES. - HAWK'S CREEK INTAKE

SOURCE TO No. 2 INTAKE 4.02

No. 3 INTAKE LITCHFIELD CREEK 2.95 - 2.1 V.

NEW SOURCE OF

#3 RES. WATERSHED AREA 1.7

STEELES CREEK WATERSHED

ABOVE HAWK'S CREEK 21.60

STEELES CREEK WATERSHED

ABOVE PROPOSED PUMPING STATION 17.1

OWNER

Height of Dam

#1 40'

#2 60'

#3 83'

POST
MAJUNE
MARCH 1919
Cl2
POST 1924 - NEW
Chlorinator
1948
Chlorination
P&E introduced.

Usable depth in feet

#1 27.5

#2 45

#3 54'

Flow line

#1 727.5'

#2 916.0'

941.0'

INTAKE #2 Res.

891.0' ELEV.

RES

#1

Flow line

727.5

16" Supply line

700.0

Depth of Res.

#

SUPPLY LINE

871.0

LAND 319.64 ACRES

INUNDATED AREA LAKES, RES. ECT. 90 ACRES

TOTAL DRAINAGE AREA 14,912

90% LAND FORESTED

1967 \$4.70 TAXED PER ACRE OF LAND

1972

319.64

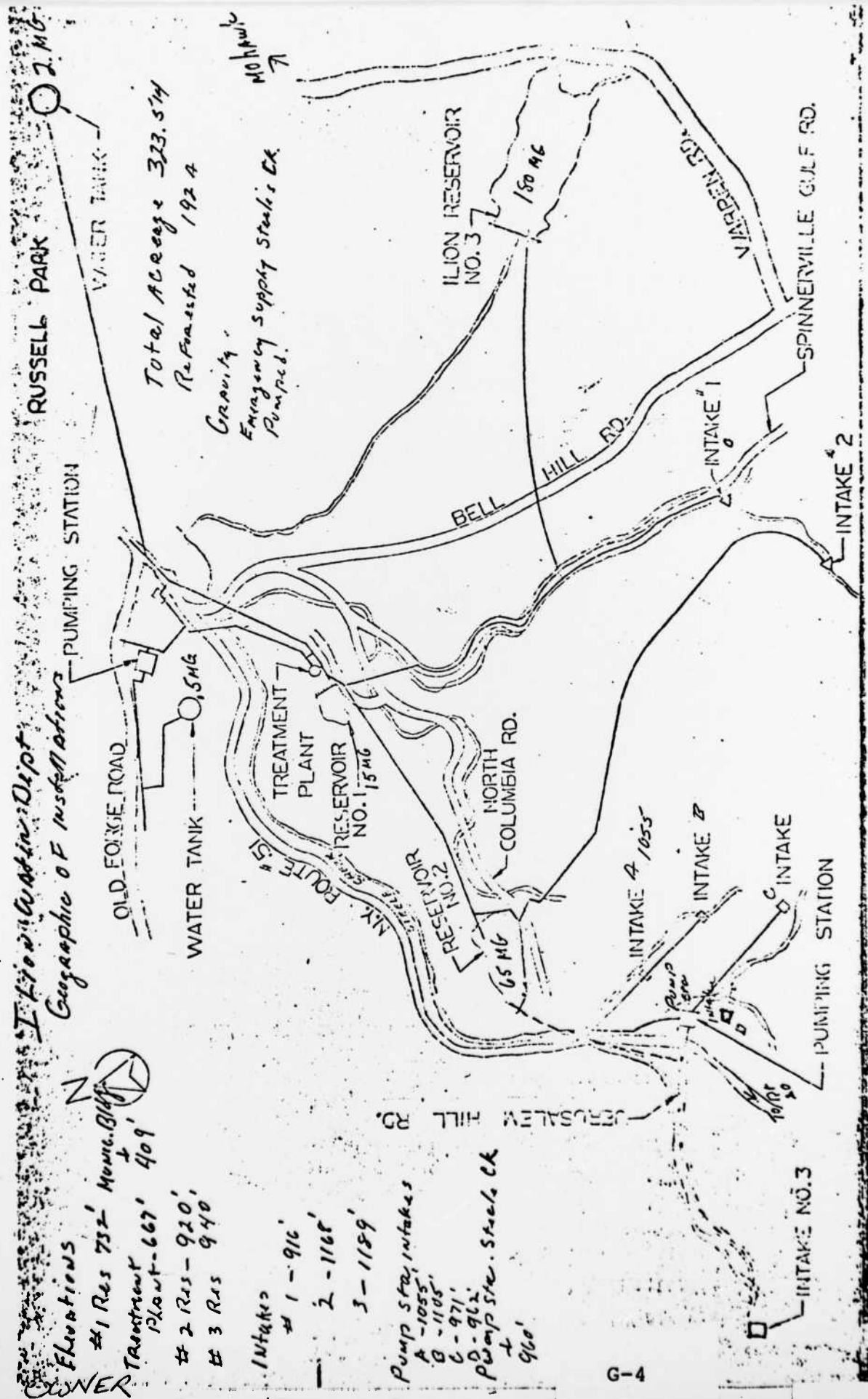
0.84

JOHNSON

3.056

OWNER

F3-40



Total Acreage 323.514
 Re-forecasted 1924
 Gravity
 Emergency supply static ex.
 Pumped.

RUSSSELL PARK
 WATER TANK
 PUMPING STATION
 OLD FENCE ROAD
 WATER TANK

I. L. Brown & Co. Inc. Dept.
 Geographic of Installations
 ELEVATIONS
 #1 Res 732' Hume. Bluff
 Treatment Plant - 667' 409'
 #2 Res - 920'
 #3 Res 940'

Intakes
 #1 - 910'
 2 - 1165'
 3 - 1189'
 Pump Sta. intakes
 A - 1055'
 B - 1105'
 C - 971'
 D - 962'
 Pump Sta. static ex.
 960'

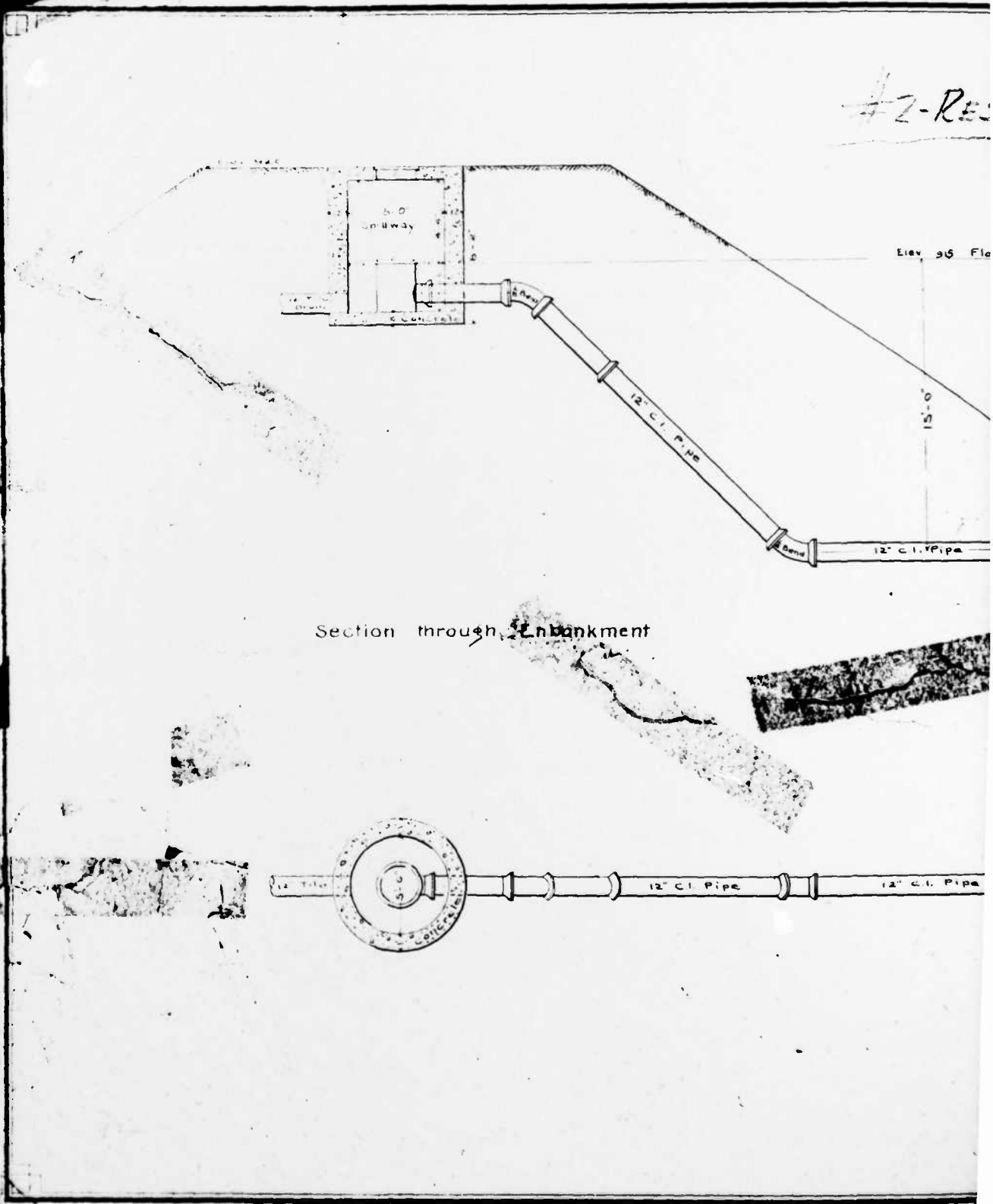
APPENDIX G

DRAWINGS

TABLE OF CONTENTS

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Design/Construction Drawings of Ilion, NY Water Works, by Knight & Hopkins - 1903	
Spillway, Dwg. # 2803	G-1
General Plan, Dwg. # 2804	G-2
Property and Rights of Way, Dwg. # 2811	G-3
Sketch of Ilion, NY Water Supply System	G-4

#2-RE-



FROM OWNER
REDUCED TO 58% OF ORIGINAL

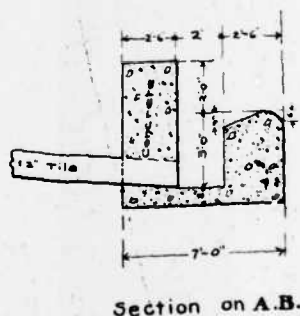
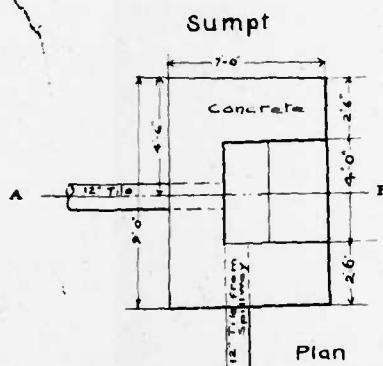
ERVOIR

SPILLWAY ILION, N.Y. WATER WORKS

1903

SCALE $\frac{1}{4}'' = 1'$

Knight & Hopkins, Rome N.Y. Dwg. "2003"

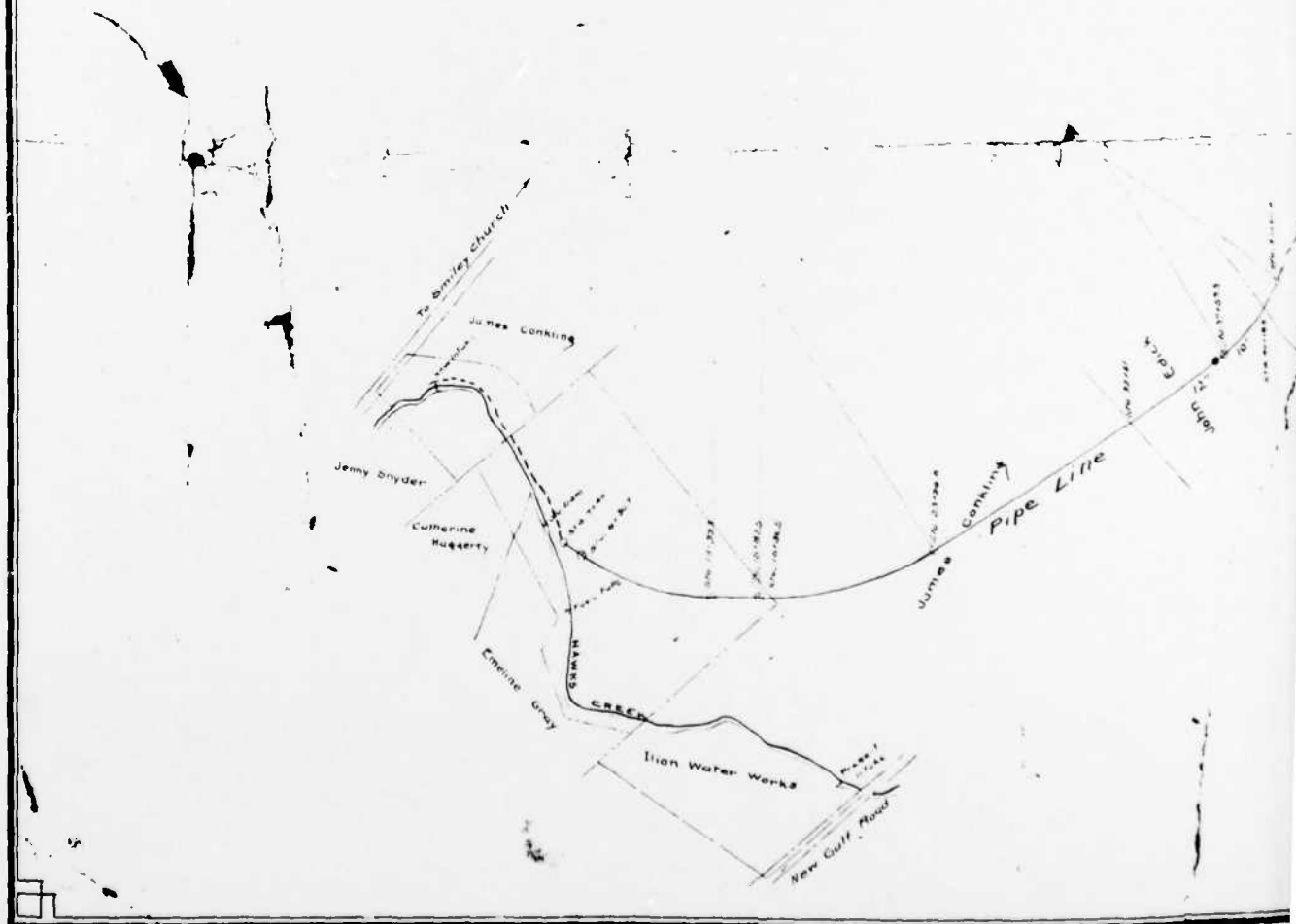


GENERAL PLAN ILION, N.Y. WATER WORKS

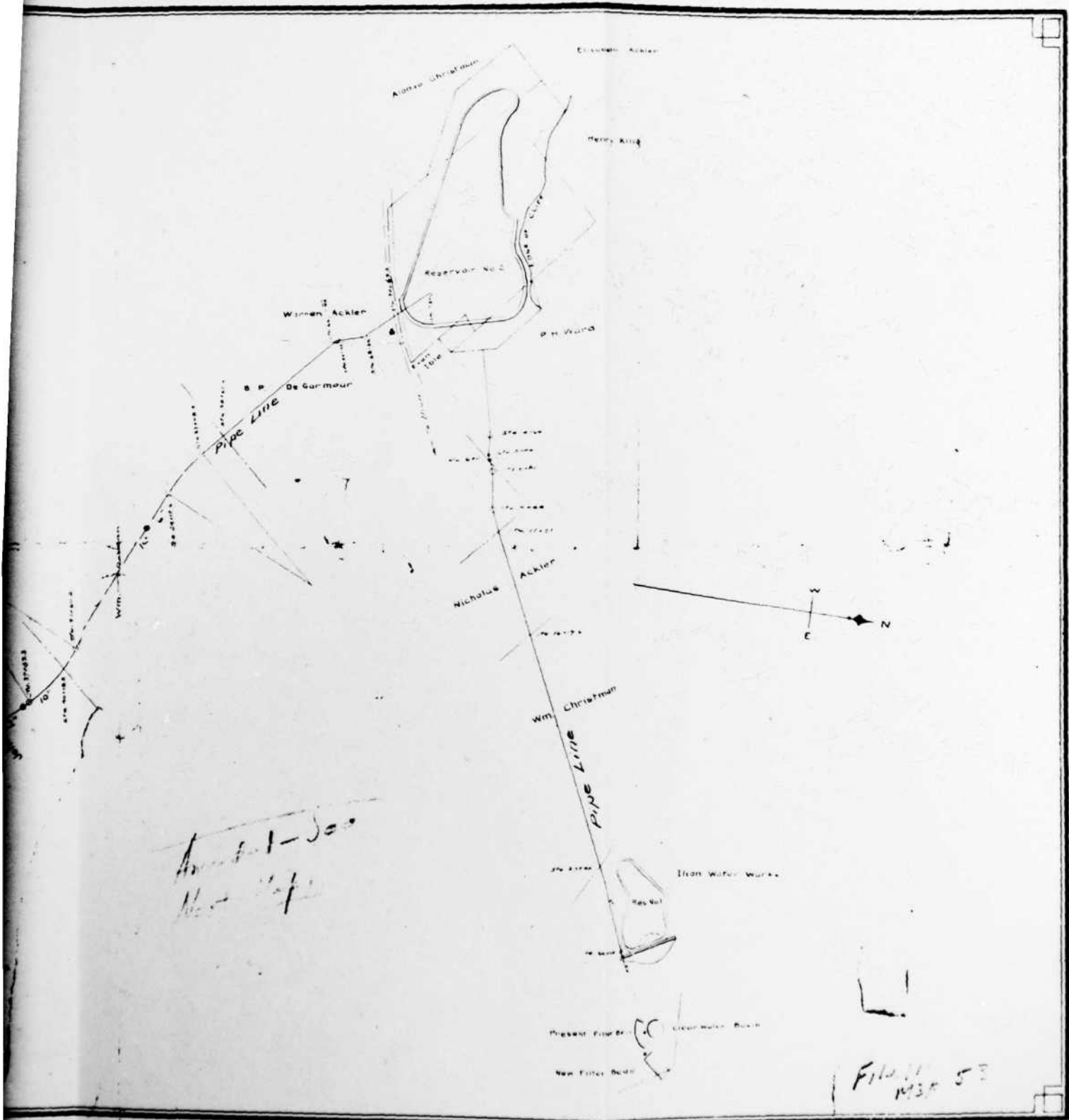
1903

Scale 1"=400'

Knight & Hopkins, ROME, N.Y. D-1 "2204



FROM OWNER
REDUCED TO 58% OF ORIGINAL





FROM OWNER
REDUCED TO 50% OF ORIGINAL

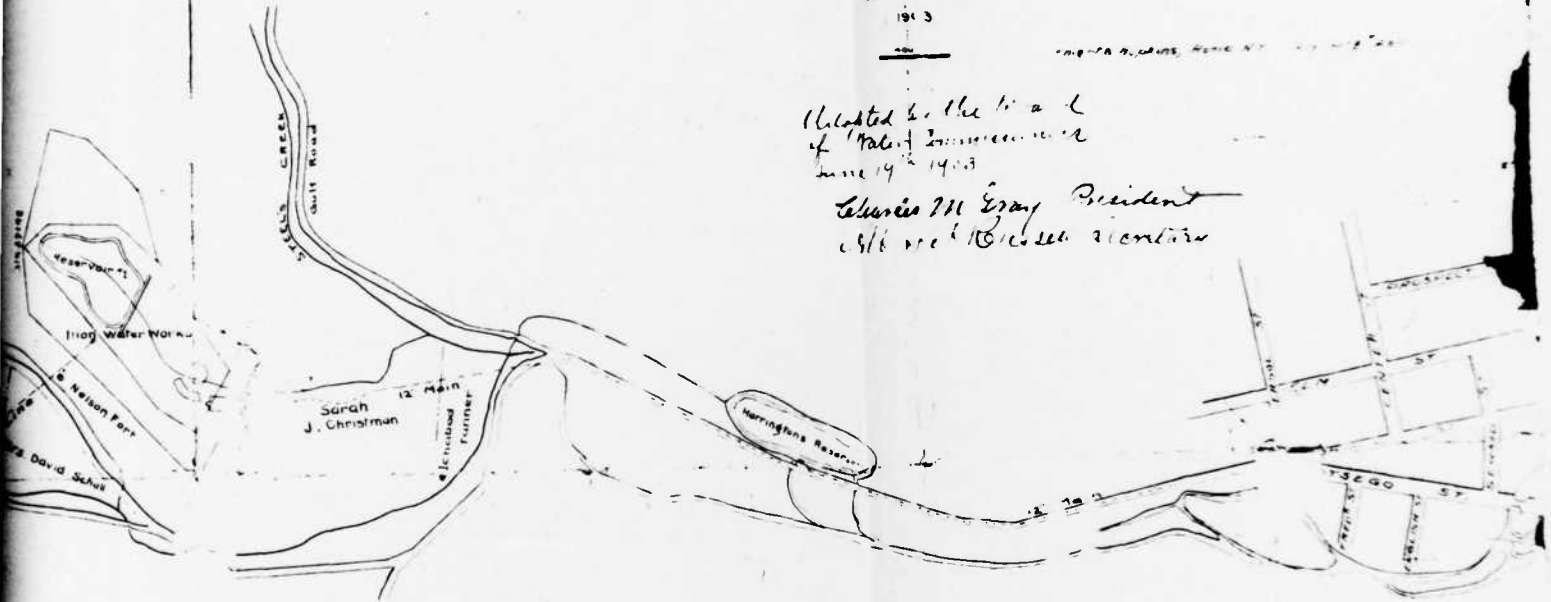
AMENDED MAP
SHOWING
PROPERTY AND RIGHTS OF WAY
REQUIRED
FOR THE
SUPPLY SYSTEM
OF THE
ILION, N.Y. WATER WORKS

Scale 1" = 100'
1913

Eng. F. A. Jones, Ilion, N.Y.

Adopted by the Board
of Public Improvement
June 19th 1903

Charles M. Gray, President
Ilion Water Works



DAT
ILM